CONTENTS.

EDITORIAL NOTES—*Gas, Lighting, &c.*:— PAGE
The South Metropolitan Gas Bill in the House of Lords . . . 67
The Proceedings of the British Association of Gas Managers at Birmingham . 68
Glasgow Corporation Gas Accounts . . . 69
The Board of Trade Return of Gas Undertakings . . . 69
The Forthcoming Meeting of the North British Association of Gas Managers in Glasgow—Dr. Williamson's Quarterly Report on the Gas Supply of the Metropolis . . . 69
Water and Sanitary Affairs:—
Sixth Monthly Report to the Local Government Board on the Metropolis Water Supply. . . . 69
The Reports of the Society of Public Analysts on the Principal Water Supplies of England . . . 69
The Lower Thames Valley Main Sewerage Board and their Drainage Scheme . 70
The Reading Corporation Sewage Farm . . . 70
Meeting of Municipal and Sanitary Engineers at Birmingham . . . 70
The Dublin Sewer Inquiry . . . 70
Leading Articles:—
The French Gas Engineers' Congress at Nantes . . . 70
Experiments with Liegel Furnaces at the Frankfort Gas-Works . . . 71
Notes:—
The French Coal-Fields—The Prevention of Stoppages in Ascension Pipes—The Explosive Power of Coal Dust—The Pumping Machinery of the Paris Water-Works—The Absorption of Gases by Solids. . . . 73
Parliamentary Intelligence:—
Private Bills relating to Gas, Water, &c. . . . 74
Progress of Bills in the House of Commons . . . 74
The Use of Gas in Lighthouses. . . . 74
Progress of Bills in the House of Lords . . . 75
House of Lords Committee—South Metropolitan Gas Bill . . . 75
Legal Intelligence:—
High Court of Justice—Queen's Bench Division—Sankey *v.* The Gaslight and Coke Company. . . . 79
Miscellaneous News:—
Exhibition of Gas-Cooking Appliances at Welshpool. . . . 72
The Rating of the Harrogate Water-Works . . . 73
Metropolis Gas Supply . . . 79
The Medals Awarded at the Melbourne Exhibition . . . 80
Some Notes from America . . . 80
Halesworth Gas Company . . . 80
The Disposal of the Sewage of Birmingham . . . 80
Institution of Civil Engineers . . . 80
The Gas Undertaking of the West Bromwich Improvement Commissioners . . 81
The Water Supply of Torquay. . . . 81
The Recent Accident at the Leicester New Gas-Works . . . 81
Keighley Local Board Water Supply . . . 81
Stockton and Middlesbrough Corporations' Water Supply . . . 81
The Purchase of the Newcastle (Staffs) Gas-Works by the Corporation . . . 81
Reading Corporation Water Supply . . . 102
The South Metropolitan Gas Company and the Sliding Scale . . . 102
Notes from Scotland . . . 103
The Tipton Local Board New Gas-Works . . . 104
The Gas and Water Supply of Tredegar. . . . 104
Register of Patents:—
Applications for Letters Patent . . . 81
The Quality of the London Gas Supply . . . 81

SUPPLEMENT.
British Association of Gas Managers—
Papers Read—
Is the Removal of the Dip-Pipe Desirable. By Mr. Charles Gandon 97
Stoppages in Ascension-Pipes. By Mr. D. Ford Goddard 99

TO SUBSCRIBERS.

Subscribers who desire to avail themselves of the reduction in the subscription to the JOURNAL by paying in advance for the second half of the year 1881, are reminded that this can only be done during the present month.

Subscribers who have not paid their subscriptions for this, or for any previous year, are requested to remit the same forthwith to the Publisher, in order to prevent interruption in the regular delivery of the JOURNAL.

TO ADVERTISERS.

ADVERTISEMENTS for the next number of the JOURNAL must be received by Monday, 12 o'clock noon, to ensure insertion.

Undisplayed Advertisements—Situations Vacant or Wanted; Apparatus Wanted or for Sale; Contracts; Tenders; Public Notices, &c.—cost 3s. for the first six lines (about 42 words) or less; and 6d. for each additional line.

The charge for Trade Advertisements is at the rate of Five Guineas per page, with discounts varying according to the number of insertions ordered; for particulars of which, apply to WALTER KING, 11, Bolt Court, Fleet Street, E.C.

TO CORRESPONDENTS.

F. F.—*Shall notice the report next week.*

W. H.—*Have received the work you forward, and have been interested looking into the subject of which you write. It is, however, too far removed from the special object of the* JOURNAL *to admit of notice in our columns.*

S. T.—*We have not any figures upon which such information as you ask could be based; and a minute's consideration will show you that it is not at all likely that any two works would be so circumstanced as to afford such comparison.*

In the fourth line from bottom of first column of page 14 of last week's issue, for "35 feet" read "35 per cent."

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JULY 12, 1881.

THE SOUTH METROPOLITAN GAS BILL IN THE HOUSE OF LORDS.

THE Bill of the South Metropolitan Gas Company has passed through the Committee of the Lords; the proceedings, as recorded in our "Parliamentary Intelligence," having commenced on Tuesday last. The net result of the final ordeal is fairly satisfactory; the great principle for which the promoters were contending, and which was most bitterly opposed by the Metropolitan Board of Works—the inviolability of the initial price fixed in 1876—having been maintained. The opposition was more successful in the matter of the capital proposed to be raised under the powers of the Bill; and the Company have had to submit to a curtailment of their wishes, amounting to half a million of money. This is a serious inconvenience, especially as the Lower House had previously cut down the allowance of capital from the proportions originally asked for. The action of the Lords' Committee in this respect supplies the element of compromise which is always more or less noticeable in parliamentary dealings with contested Bills; and however much the consequent crippling of the powers of the Company may be regretted, it is matter for congratulation that a like process was not at the same time applied to the settlement of the dispute on the question of initial price. It is unfortunate that the Chairman, in announcing the intention of the Committee to leave the initial price untouched, should have thought fit to append an observation which may be made to appear as a deliberate invitation to a re-opening of the question on a future occasion. It may, however, be remarked that the Committee—although their decision would naturally have wide application as a precedent—were not trying the abstract question as to whether a bargain entered into by a public body is to be always held inviolate, but simply whether the initial price granted to the South Metropolitan Company in 1876 should be revised. They decided that it should not be altered, and their act is of infinitely greater importance than their opinions on the general subject; for if the question is to be argued afresh at any future time, it will have to be shown that greater reasons exist for a change than could be proved by the Metropolitan Board of Works for the present year as compared with the year 1876.

The interval that had elapsed since the Bill left the Commons had been made good use of by the Metropolitan Board in consolidating their case for the Committee of the House of Lords. It must be acknowledged that the arguments of the Board in opposition to the Company latterly possessed a coherence and solidity which were conspicuously lacking when their Counsel on the previous occasion floundered helplessly and aimlessly in search of a case. It was at least possible to disentangle something like three or four definite contentions from the mass of talk which was piled up against the Bill on Tuesday and Wednesday last; but, after all, the opposition was very rickety. The Metropolitan Board sought to strengthen their case by calling witnesses—one of whom, in the person of Mr. Richardson, was economically meant to embody policy, engineering, finance, and law in a single encyclopædic individual; but it is doubtful if the advantage gained in this respect was sufficient to compensate for the damaging effect of Mr. Michael's masterly reply. Mr. Richardson was certainly not happy in his testimony; he appeared to know too much, and his strained attempts to instruct the Committee and everybody else, in everything but what was vital to the questions at issue, led to the only amusing passages in the whole business. The main arguments of the Counsel for the Board on the question of charge appeared to be that the initial price must be subject to revision; that this price in the present instance is too high, since it gives the Company more than ten per cent. dividends; and that the Amalgamated Company had, without sufficient reason, applied the price originally granted to the South Metropolitan Company, when it stood alone, to the undertakings of the Surrey Consumers' and Phœnix Companies.

With regard to the first contention, the existence was denied of anything like an understanding that the legislation inaugurated in 1875, when the sliding scale was introduced, was to be considered final, and to take the place of revision clauses and all other methods of regulating the profits of the Gas Companies. Such an idea was in the present case scouted by the Board's advisers, notwithstanding the historical fact that from such a cause proceeded the absence of opposition, on the part of the Board, to the application by the South Metropolitan Company in 1876 to be placed on an equality, as regards initial price, with the Companies north of the Thames. When it is remembered that the Board on that occasion stood aside, not having quite sufficient inconsistency to set their face against the proposals they had themselves advocated in the previous year, their present action appears utterly devoid of excuse. Possibly, however, it may be that Mr. Richardson, who has in this matter overridden the Parliamentary Committee of the Board, is unable to grasp the purport of past negotiations, in which he confesses to have taken no interest at the time. Be this as it may, however, we have proof that there is no more life in the much debated "bargain" of 1875; it undoubtedly survived through the succeeding year, but

must have died and been almost forgotten before the expiration of the fourth year from its birth. So be it. Henceforth the Companies will know that their reliance must be upon current facts and conditions, and not on "understandings" which do not survive their authors. It behoves every one who may be interested in modern gas legislation to bring his mind to the study of the sliding scale and auction clauses, as illuminated by the results of the case in point; and, above all, to satisfy himself with regard to the essentially permanent character of the initial price. For if the first exponents of the new system turn round and seek to discredit it, what may not be expected of others who at various times have followed their lead? With all this it must not be forgotten that in the present instance the Metropolitan Board failed to show that any reduction in the initial price would benefit the consumer, while the glaring wrong inflicted on the purchasers of stock with a dividend at twelve per cent., by reducing the dividend to ten per cent., cannot be minimized, in spite of Mr. Richardson's *naïve* admission that he had not considered the case of these people. The Committee, however, did not fall into the trap so artfully prepared for them; and it would be well if every one who has not yet quite determined in his own mind the relative status of gas consumers and shareholders, in the matter of dividend, would take their example to heart.

The second point brought forward by the Board was of more limited application than the general principle just discussed, and is more easily dealt with, since they themselves supply the answer. The argument that dividends under the sliding scale were never meant to exceed the old maximum of ten per cent. is transparently absurd. It would be as sensible to say, from the Company's point of view, that dividends were never intended to fall below the same figure. Hence, by the operation of these two considerations, we arrive at the happy result of the *status quo*, or more popularly "as you were." If dividends are neither to go up nor down, where is the use of going through an elaborate farce to get a sliding scale fixed? The Metropolitan Board would probably, as of old, agree to the dividends going down but not up, although as a result in the latter case of cheap gas. Thus do they befriend the consumer. But the Board are the last who should air this consideration, since in 1876, when the original South Metropolitan Company were selling gas at 3s. per thousand, they declined to oppose the grant of 3s. 9d. per thousand as an initial price, although it would have immediately empowered the Company to declare a dividend of twelve and a quarter per cent. After this, the Board's advisers can now allege that 3s. 6d. is too high an initial price, when it actually enables the Company to pay a smaller dividend than that to the prospect of which they themselves did not object five years ago! Whence, then, is the idea derivable in the present connection, that ten per cent. is the guide for the sliding scale dividend? We do not deny that generally the old maximum dividend is taken as the guide for the establishment of an initial price; but in the special case of the South Metropolitan Company it was far otherwise.

As to the last point we have to deal with—the way in which the circumstances of the South Metropolitan Company of 1876 have been modified by amalgamation with other Companies—our task is easy. Having stated that the initial price of 3s. 6d. was given to the South Metropolitan Company when they were selling gas at 3s. per thousand cubic feet, it may well be considered ridiculous to suppose that the respective Companies selling gas at ninepence and fourpence per thousand feet dearer would have had a lower initial price allotted to them. Such a thing is hard to reflect upon with due seriousness, when it is known that the Metropolitan Board would have rejoiced to see their own favourite initial price of 3s. 9d.—which the South Metropolitan Company would have obtained had not their previous maximum price stood at 3s. 6d.—imposed on either or both these extinct Companies, working together or separately. Mr. Bidder, in particular, laid such stress on the legal aspects of the amalgamation, and the insufficiency of the powers by which the price had been applied to the absorbed undertakings, that it almost looked as though it were the wish of the Board to upset the whole arrangements, Order in Council included, in spite of the many acknowledged benefits that have accrued to the consumers. We have already dealt with these matters at such length that we cannot pause to contemplate the policy of the Metropolitan Board in its minor phases, as displayed in the course of these proceedings. Suffice it to say that the opposition seemed to be inspired with the spirit of a squabble at *nisi prius*, in which victory must be secured at any price. In many parliamentary contests, and in this one as much as in any, it has been our fortune to see a display of party eagerness, irrespective of the desire for the attainment of a just deliverance, which is most painful. This selfishness of motive may answer well enough in the Courts; but, surely, when two public bodies are met to discuss matters of public importance, it is immaterial which side wins, so long as right is done. It may appear strange that where personal motives are least evident there should often be most bitterness, but so it is; and it is not to the credit of the Metropolitan Board of Works that they should occasionally give way to influences which lead them to pursue lines of action as narrow and ill-directed as those of the smallest and most benighted Vestry in the land.

THE PROCEEDINGS OF THE BRITISH ASSOCIATION OF GAS MANAGERS AT BIRMINGHAM.

Mr. Gandon's communication to the meeting of the British Association of Gas Managers, on the subject of the hydraulic dip, was of a very unpretentious and at the same time eminently useful character. To begin with, Mr. Gandon's remarks on the oscillation of the pressure or vacuum in the retorts with a hydraulic seal were very sensible. There always will be oscillation when the dip-pipes are sealed, and although different forms of exhausters undoubtedly affect this phenomenon, and sometimes to a serious extent, the arrangements of the outlet mains have also much to do with it. There were ample reasons why Mr. Gandon should have tried an anti-dip system of some kind, and he stated with commendable fairness the reasons that led to the adoption of a specially designed apparatus such as that described in his paper. The author has referred to the paucity of communications on the subject to the Association, and so it is that the fullest information on the working of other arrangements is derivable only from the statements of the respective inventors. Such statements are not always to be relied on, and we are therefore somewhat in the dark as to whether Mr. Gandon's apparatus is, from a mechanical point of view, better or worse than many others. If it is granted that in its immediate purpose it succeeds as well as the majority, we may freely approach the broader issue which lies behind the mere question of apparatus, and discuss with Mr. Gandon the main point as to the desirability or otherwise of removing the dip. He treats this as a pure question of principle should be treated—assuming nothing, but stating facts as they have come under his notice, and the opinions he has formed thereon irrespective of prejudice or favour. On the whole, the author is decidedly favourable to the anti-dip arrangement, on the grounds of increased yield of gas and diminution in the deposit of carbon. These claims are at least intelligible, and their value can be estimated and compared with the cost at which they can be secured. We consider Mr. Gandon's retreat to moderate heats, after trying a higher power, as somewhat of a defeat, and trust he will have perceived in Mr. D. F. Goddard's paper, which followed his own, another way out of his old difficulty.

Mr. Goddard had an old plague of gas managers to deal with, and he is to be congratulated that, after the prolonged struggle, the victory rests with him and not with the enemy. With respect to the style of Mr. Goddard's communication we have already expressed ourselves; but it may be repeated here that it was a model for all efforts of the kind. Complete and yet brief, it invested with fresh interest a theme which is almost as old as gas lighting itself. The author's experience of trouble is that which at one time or another has afflicted many a gas manager; and he will have earned the gratitude of his fellows if, having suffered with them, he has now enabled them to rejoice with him. To run off the contents of the hydraulic main every day, and at the same time to drop water into the ascension-pipes, appears a very simple combination of expedients; but we do not recollect having before seen them both advised together. Mr. West's remarks on the stopped pipe difficulty were most apposite. He really left little to say on the subject, for most of his observations could be translated into perfect agreement with Mr. Goddard's facts, although some of his reasoning was slightly different. In the matter of carrying forward coal dust in the current of gas, for instance, we are more disposed to side with Mr. West than with Mr. Goddard. It is difficult to imagine how the dust can be so transported, while it is comparatively easy to see that a mixture of powdery carbon and pitch, both of which may be readily deposited in an ascension-pipe, might occasionally present a close similarity to real coal. It cannot be said that the discussion of either of these two papers—the last read before the meeting—was what it ought to have been, owing to the lack of time. The two subjects are closely related, and there can be no doubt that, under favourable circumstances, much more

interesting comment would have been made on them than was possible on the occasion referred to. This was decidedly not the authors' fault, and it may be hoped that if such another opportunity should present itself, those who are responsible for making the arrangements will be careful to prevent such useful contributions from being stowed away after nearly everything else, until there is no chance of their doing so much good as might be expected of them under more favourable conditions.

GLASGOW CORPORATION GAS ACCOUNTS.

Much interest is likely to be excited at the next meeting of the Town Council of Glasgow by the consideration of the following motion:—

That in view of the heavy responsibilities of the Corporation in connection with the gas supply of the city, and the progress which is being made in the practical application of the electric light, the Town Council agrees to apply any surplus which has accrued from the manufacture and sale of gas during the past financial year towards the reduction of the capital account of the gas; and further resolves that previous to the price of gas being fixed for the current year, the Gas Committee be instructed to consider and report on the best means of reducing the liabilities of the Trust, and the propriety of imposing a differential rate on all consumers without the municipal boundary.

We understand that the question which is in this way to be formally raised has been very freely canvassed in private during the past few weeks amongst the Gas Commissioners, and from this circumstance it may be conjectured that in the minds of a number of them it is considered of importance. When the dimensions of the Glasgow Corporation gas undertaking are borne in mind, we willingly admit that the subject is one that ought to be boldly faced by those who are responsible for the administration of the municipal affairs of the commercial metropolis of Scotland, the so-called "Second "City of the Empire." No doubt the Commissioners are witnesses of various attempts, more or less successful, to bring the electric light into use in the principal railway stations, and in various industrial establishments within their area; and it is but natural they should manifest some degree of anxiety as to the future financial condition of the Gas Trust. In dealing with the complicated financial affairs of the Trust, Councillor Ure, and those of his colleagues who are acting with him, have a serious undertaking before them if they wish to convince the Gas Commissioners generally that they would be justified, if they are not even morally bound to proceed more rapidly to reduce their capital account, which, if we mistake not, practically amounts to a million pounds sterling. Of this sum about £530,000 is the value at which the three gas manufacturing stations—Dalmarnock, Dawsholm, and Tradeston—are set down in the books of the Trust; but it is confidently affirmed that £300,000 would be a large figure at which to value them, even as a going concern; which means that under the head of works alone the rated value is £230,000 more than it ought to be. Of course, there are many other accounts that must be considered in dealing with the question at issue, and quite as many phases under which the whole subject should be viewed. Possibly the Conveners of the Gas and Finance Committees may be able to show some of their colleagues that things are not just as bad as they seem; and until Councillor Ure and his colleagues have stated their view of the case, we shall refrain from expressing any opinion on the matter; indeed, we should not be justified in doing otherwise until the past year's accounts are before us.

THE BOARD OF TRADE RETURN OF GAS UNDERTAKINGS.

Mr. W. Livesey, the vigilant Secretary of the Gas and Water Companies' Association, sent out some time since detailed information respecting the two Orders made by the House of Commons, on the 10th and 27th of May respectively, in reference to gas and water undertakings. The former is concerned simply with parliamentary practice in the matter of the *locus standi* of public authorities opposing money Bills; but the latter is of immediate importance to all authorized Gas Companies in the Kingdom. Action has now been taken by the Board of Trade in the matter of this Order, and Mr. H. G. Calcraft, the Assistant-Secretary of the Railway Department of the Board, has addressed a circular to the Secretaries of all Gas Companies concerned, enclosing a form to be filled up by them which will have the effect of laying bare the financial and general position of such undertakings. We remarked, at the time when the return was asked for, that it would not include under a special heading any information respecting dealings in old shares under the sliding scale clauses. There is a column reserved for the amount of capital sold under the auction clauses, and another column is intended to give the amount of premium realized by the sales of shares under such clauses. These two headings are complementary to each other; but although they provide for a complete statement of the working of modern legislation as directly affecting the Companies, it is evident that the effect of the same conditions upon individual shareholders, as shown in transfers of shares, will not be made apparent unless this is specially given by the officials making the returns. We are still in the dark as to the objects sought to be obtained by this parliamentary paper. Time alone will show the use for which it is intended—whether it is desired merely as affording an authoritative basis for comparison between Companies when they individually come before Parliament, or—which is more likely—whether it is meant to form the basis of further general legislation.

The proceedings of the North British Association of Gas Managers at the twentieth annual meeting, to be held in Glasgow on Thursday and Friday, the 21st and 22nd inst., bid fair to be of much interest. Mr. James M'Gilchrist, of Dumbarton, is the President, and the business arrangements of the meeting are of a very practical character. There will be submitted to the members seven papers, every one of which may be expected to lead to profitable discussion. The occasion of the dinner to be held at the close of the first day's proceedings will be taken for the presentation of the testimonial to Mr. William Mackenzie, who has rendered inestimable services to the Association. It is proposed to close the gathering with an excursion to Loch Lomond, the opportunity afforded by the meeting of the members in Glasgow being thus seized for a pleasant termination by a water trip. We are pleased to think that there is every indication of a successful meeting.

In another part of the Journal is published, according to custom, the quarterly report of the Chief Gas Examiner for the Metropolis (Dr. Williamson, F.R.S.), on the gas supplied for the period ending the 30th ult. by the three Companies which come under his supervision. The most remarkable feature in this statement is the high illuminating power of the gas at all the stations, the legal minimum being exceeded by about one candle, or even more, in most instances. There has been no sulphuretted hydrogen detected anywhere during the three months, and sulphur in other forms has been much below the limits allowed; the Commercial Company having deserved particularly well in this respect, their gas averaging less than ten grains in the hundred cubic feet over the quarter. Ammonia is stated to have been present at all the stations except Jewry Street, but of course in very insignificant quantity. Altogether the report, even for a summer quarter, is a highly satisfactory one.

Water and Sanitary Affairs.

In their last report to the President of the Local Government Board, Mr. Crookes, Dr. Odling, and Dr. Meymott Tidy are able to sum up the results of a daily examination of the London Water Supply for a period of six months. In the course of this time they have examined 1127 samples, and they give it as their opinion, founded on the experience thus gained, that the Metropolitan Water Supply is "unim-"peachable." The present report extends from May 20 to June 30, and henceforth the reports will coincide with the several months of the year. In referring to the tint of the daily samples, as determined by the colour-meter described on a former occasion, Mr. Crookes and his colleagues say that "practically the waters differ very little in their appearance "(even when examined in large bulk) from distilled water." Considerable interest will attach to the announcement that these celebrated chemists have for several months past been experimenting on a method whereby the slight amount of clayey matter occasionally present in the waters could be determined with a nearer approach to quantitative accuracy than is possible by classifying the samples under the headings, "Very slightly turbid," "Slightly turbid," and so on. A hope is expressed that the results achieved in this direction may be made known next month. None of the samples in the past month were worse than "very slightly turbid."

The *Analyst* for July is almost wholly devoted to the Water Question. One of the Editors, Mr. Wigner, has been endeavouring to devise a scheme for the systematic valuation of the impurities found in potable waters, based upon the plan of giving a numerical value to each constituent. Thus half a grain of chlorine in a gallon of water would be represented by the figure 1, traces of phosphoric acid by 2, heavy traces by 4, and very heavy traces by 8. If any single value exceeds 10, the excess over that amount is to be doubled, and added

to the total. Vegetable *débris* in small quantity is to count as 4, and in large quantity as 8. Diatoms and bacteria are likewise to be valued, and so on through the entire category. Of course it will be seen that the value of a constituent depends very much on the company it keeps, and also on what is called the history of the water. It must be difficult to devise a scale that will give a true expression under all circumstances. Dr. Frankland has himself been obliged to make an exception on behalf of the Kent water, when estimating the "previous animal contamination" of the London Water Supply. Mr. Wigner began his enterprise three years ago, or more. The scheme was then discussed by the Society of Public Analysts, and it has just been discussed again, in a somewhat amended form. Mr. Wigner has submitted the results obtained in a variety of cases, and seemingly the scheme is one which, with certain precautions, may be turned to some good account. The conclave of analysts having on this last occasion debated the subject at great length—that is to say, until "an unusually "late hour"—finished by resolving to discuss it again in January next. A valuation is given in respect to the analyses which have been published in the *Analyst* concerning the public water supplies of England. We find in January last the Kent Company figuring as high as 42, while the Grand Junction was down to 32. The lower the figure, the better the water. Mr. Wigner suggests 40 as the limit of a first-class supply, and 15 as that of water of exceptional purity, with 65 as a fair limit for second-class water. The water of Greenock is condemned, with a valuation of 94, the fault consisting chiefly in the proportion of oxygen absorbed, which alone gives a value of 41. "It is evident," says Mr. Wigner, "that the water is lamentably non-oxygenated," and, judging by present appearances, he does not consider it "at all too strong to say that the water is unfit to be "used as the public supply of any town." The King's Lynn water, valued at 106, is "bad all round." Last month, the water of King's Lynn was even worse than this, standing as high as 131; Rochdale was as low as 8. In London, the New River supply had the figure of 18; while the Kent was 23, and the East London 36; this last figure being the highest, and that of the New River the lowest. This mode of estimating the "bad points" of the water supply is ingenious, but it is scarcely possible that any such method can be implicitly followed. One gentleman, for instance, wished to distinguish between "innocent bacteria" and those which would cause disease. We can only hope that the discussion of the subject will promote a better understanding as to the difference between good water and bad—a point concerning which there still seems to be a considerable amount of obscurity. But we observe that, in fixing a standard of safety, Mr. Wigner arrives at the conclusion that the London Water Supply must, "under ordinary circumstances, be considered of first-class "quality."

Mr. Hawksley has sent his report to the Lower Thames Valley Main Sewerage Board, as to the best mode of dealing with the sewage of the district. The recommendation made by Mr. Hawksley is based not merely on engineering principles, but upon considerations of expediency. He deems it almost impossible to carry through Parliament any other scheme than one for discharging the sewage of the district into the estuary of the Thames; as, for instance, at a point near the mouth of the Darent. Irrigation and precipitation thus seem likely to suffer rejection, and the more facile plan of taking the sewage a long way and then casting it into the river, is the one which claims adoption. In reporting on the subject, Mr. Hawksley speaks of the drainage problem of the Lower Thames Valley district as "a very exceptional case." He proposes that the sewage shall be collected from the various sub-districts into a cast-iron main-pipe, laid so as to follow the varying levels of hill and valley, through which the sewage is to be propelled by steam power. At the outfall the pipe is to have a diameter of 3 feet. Between this point and Richmond it may gradually diminish to 2½ feet, or something less; at Kingston the diameter may be about 2 feet; and at the upper end of the district 18 inches would be sufficient. The iron main-pipe is recommended partly because it may be generally laid along the public highways, and so avoid interference with private properties. It is proposed that the engine power shall be at East Molesey, Kingston, Richmond, and Barnes, the main power being at the latter place, where the engines should be in triplicate, each capable of exerting a force of about 100-horse power. At the stations there should be underground tanks, capable of holding from four to six hours' sewage. Mr. Hawksley's estimate of the expense of the proposed undertaking, commencing at West Molesey and terminating at the mouth of the River Darent, where there is to be a tidal outfall basin, is £274,000 net. To this must be added parliamentary and professional charges, possible contingencies, and interest during construction. The Board are going to have a special meeting to consider all this, with Mr. Hawksley present to assist them.

The Corporation of Reading, with a numerous party of fellow-townsmen and visitors, went over the local sewage farm last week, and were entertained by the Mayor at an excellent luncheon, when speeches were made in reference to the proceedings of the day. The farm is in two parts, one being already in operation, while the other has only just been prepared for the reception of sewage. The crops on the older portion are in a most flourishing state, the dry season having afforded peculiar advantages for sewage irrigation. Rye grass is the principal crop, supplemented by roots and oats. The cattle are stated to be in excellent condition. The sewage is distributed by means of carriers, and the land consists of a very light alluvial soil on gravel. The effluent water was found to present a very satisfactory appearance, and on no part of the farm was there any odour that could be fairly made a ground of objection. All that the Corporation now want is a good substantial tenant for the newly laid-out land; but, unfortunately, these are not very promising times for letting a farm, whether under sewage or otherwise.

The Association of Municipal and Sanitary Engineers and Surveyors held their annual meeting last week at Birmingham, when Mr. W. S. Till, the newly-elected President, delivered an address descriptive of the sanitary system of the borough. A visit was also paid to the sewage farm at Saltley, where the members were met by Alderman Avery, who conducted the party over the works, and explained in detail the nature of the various operations. At the annual dinner some sensible remarks were made by a member of the Town Council, who deplored the general indifference of the middle classes to the subject of sanitation. At present—so he argued—many wealthy people seem only anxious to build large and showy houses, without paying any consideration to those sanitary arrangements which are of such vital importance to health and comfort. By the exertions of inspectors of nuisances and other municipal officers, the humbler people are pretty well looked after, and the worthy Councillor "really thought that those who required attention now were "those who fancied they knew so much, but proved by their "practice that they knew so little." This is a fair hit, though the sanitary condition of the poor is still very unsatisfactory in our large towns, the great difficulty being the tendency to overcrowding, exaggerated by habits of intemperance and consequent penury.

The agitation on the subject of the Dublin sewerage works still continues, and at the last meeting of the Corporation, Councillor M'Evoy claimed permission to move a resolution which virtually reopened the whole question, proposing a fresh investigation by a new Committee. The Lord Mayor, as soon as the resolution was read, declared that he and the Corporation generally were "getting sick of the sewerage "question." Mr. M'Evoy, having but a small following in the Council, failed to carry anything, and the letter of the Irish Local Government Board, upon which we offered some remarks last week, was referred to the Public Health Committee.

THE FRENCH GAS ENGINEERS' CONGRESS AT NANTES.

On Tuesday, the 14th of June, when the members of the British Association of Gas Managers were gathering in the Masonic Hall, Birmingham, a very similar meeting was being held at Nantes, where the congress of the Société Technique de l'Industrie du Gaz en France was in full session under the presidency of M. Albert Ellissen. Most of the leaders of gas engineering in France were present, and 114 old members of the Society faced the President, there being also a great number of new members elected at the commencement of the proceedings. According to the *Journal des Usines à Gaz*, the congress, which lasted three days, was extremely successful and brilliant. The number of members present, the abundance and interest of the subjects treated, and the welcome accorded to the Society by the Municipal Authorities of Nantes and by the European Gas Company, were all elements to which the recorded success of the gathering was due. There were five memoirs presented to the Society at this meeting, to four of which were awarded prizes ranging from 750 frs. to 250 frs.; and there were also forty-four communications, on a multiplicity of subjects. It was announced by the President that in consequence of the annually increasing number of communications submitted to the Society, it will become impossible to read them all during the necessarily limited duration of the annual congress. He therefore proposed, and the suggestion was unanimously adopted, that for the future all papers should be printed in advance,

and distributed among the members upon the opening of the meeting, and that the sittings should be entirely devoted to the discussion of these communications, with the double object of lightening the work and making the proceedings profitable.

The President's address was warmly received, as it deserved to be. He commenced by recounting how in 1874 a small band of eleven gas engineers, including himself, came together for the purpose of forming the bases for a French gas association. At the present time, after the lapse of seven years, the number of members stands at 367—a rate of progress which must be considered remarkably satisfactory. After paying a graceful tribute to the memory of the recently deceased members, the President went on to give the details of the numerical standing of the Society, and also read a list of the gas companies and others who support the association by annual subsidies. These now amount to 16,650 frs., or about £670, and there can be no doubt that the Society is indebted for its very existence to these public subscriptions, which are the outcome of the system of subventions that pervades public life across the Channel, and to which we are almost complete strangers.

M. Ellissen proceeded to assist the ex-President, M. Jordan, in his efforts to clear the reputation of gas engineers from the reproach of "routineers" and enemies of progress which, in France as elsewhere, is levelled against them by men who think themselves their superiors in science and intelligence. He went over the record of the advancement of the art of gas manufacture and distribution during the past year, and brought into relief the decided steps that have been taken of late to improve the quality and cheapen the production of gas in different parts of the world. The subject of carbonizing coal with regenerative gas furnaces was first referred to by the President, who, while giving every credit to workers in other countries, justly assigned to Germany the place of honour in this respect. The matter has been more thoroughly investigated, and the principles thus ascertained have been more generally put into practice in that country than elsewhere, for while not less than 100 works have been altered, or are now in course of conversion from grate furnaces to generator firing, there are nearly as many varieties of gas furnaces as works. The President mentioned Dr. Schilling's arrangement as being the most complete of its kind, as testified by results. It is stated that Dr. Schilling carbonizes his coal with a consumption of coke for fuel averaging only 14 per cent., by weight, of the weight of coal distilled; the spent furnace gases are brought down to 600° before leaving the setting; and the charges are of four hours' duration, without trouble in the ascension-pipes. This record, referring moreover to the performance of an unpatented system, speaks for itself, and amply justifies the high estimate which M. Ellissen has formed of the design in question.

Speaking then of stoking machinery, M. Ellissen mentioned the Ross machines as about to be erected in a large French works, and gave a brief account of the principle upon which the Ross charging machine is constructed. The pressing question of condensation was next treated, and M. Cadel's communication of last year on the subject was highly praised by the President. This paper, as will be remembered from the translation which appeared in our columns at the time, was devoted to an advocacy of the principle of hot condensation, which, as exemplified in the Livesey fractionating process, or the St. John apparatus, consists in keeping the warm gas and light tar in prolonged contact with each other. Mr. Spice, who is an honorary member of the Society, having, by the concurrence of the Birmingham meeting, been prevented from attending with a promised paper on the working of the St. John apparatus at Rochdale, the President took occasion to express regret to the clashing of the two events, which he said would be prevented in future.

M. Ellissen naturally mentioned Dr. Siemens's proposals for the fabrication of lighting and heating gas from the coal in the same charge, since he furnished Dr. Siemens with some of the principal data on which the suggestions brought forward at Birmingham were founded. The President recounted his figures, which are undoubtedly interesting, and not without a certain value; but he did not commit himself to any opinions for or against Dr. Siemens's plans, except to remark that, if carried out, they would experience certain practical difficulties which he was not disposed to regard as impossible to overcome.

The idea of making separate heating and lighting gas brought M. Ellissen to the question of the utilization of gas, as improved during the past year. He referred to the work of Mr. Sugg in Parliament Street and Whitehall as demonstrating, in the hands of The Gaslight and Coke Company, the economy of gas lighting as compared with the electric light. From this the President went on to speak most hopefully of the invention of Mr. Friederich Siemens, whose regenerative burners were shown in profusion during the congress. The best show of these grand burners that has yet been held must have been that at Nantes on this occasion, for, aided by the European Gas Company, and favoured by the Maire of the town, a score of different patterns of the lamps intended for street lighting, workshops, &c., were exhibited in full action on the quays and in the principal parts of the place. Dr. Siemens had also sent M. Ellissen one of his own improved burners, similar to that on view at Birmingham, and it was mentioned and shown by the President in the hall.

These matters, brought forward with so much clearness by the President, afforded in themselves a fair epitome of the diverse directions in which gas engineers are effecting improvements in old methods of working. As M. Ellissen remarked, from a consumption of 127 litres of gas per hour, necessary to produce with ordinary burners a light equal to that of one Carcel lamp, we have now arrived at the same effect by the consumption of only 30 litres of gas. According to the President, the progress of gas for heating and cooking purposes is nowhere more marked than at Nantes, where, under the fostering care of the gas-works officials, one-third of the annual consumption of the whole town is used for these purposes. With reference to the general question of the use of gas indoors, Mr. Backler, of the European Gas Company, has seriously called the attention of the Society to the prime necessity for ventilation in connection with gas-burners; and the President was able to mention that a memoir on this subject would be read before the meeting.

Respecting the forthcoming exhibition of electrical appliances to be held in Paris during the autumn, M. Ellissen announced that the Society would hold an extraordinary meeting on the occasion, in order that the members might view the exhibits in company, and at the same time have an opportunity of exchanging ideas on the subject of what they had seen. Lastly, the President concluded his most interesting address by referring to the process, now observable in France, of the fusion of many separate undertakings into large united companies, upon which tendency he expressed his congratulations, deeming that large and wealthy organizations would naturally be able to further the interests of research and improvement in manufacture and distribution better than isolated establishments.

After the delivery of the address, the reports of the Committee and Treasurer were read, and the award of prizes was made to the authors of the best memoirs, and to the workmen who had been selected to receive long-service rewards. We shall, as usual, give translations of the more noticeable papers as they are published. We have only to add that the business proceedings of the congress were varied by several excursions and banquets, and that it is expected there will be a good attendance at the supplementary meeting in Paris.

EXPERIMENTS WITH LIEGEL FURNACES AT THE FRANKFORT GAS-WORKS.

By invitation of Herr Simon Schiele, the Engineer to the New Gas Company at Frankfort-on-the-Maine, Dr. Bunte, the well-known chemist at Munich, has made analyses of the generator gases and the waste gases from the Liegel settings at work there, a report on which, together with a tabulated statement of the analyses, appeared in a recent number of the *Journal für Gasbeleuchtung*.

It will be in the recollection of those acquainted with the progress of the generator system in Germany that Herr Schiele, at Frankfort, was one of the first to adopt the Liegel furnace, and consequently, it should be understood, the furnaces there constructed are of an early type, and do not embody the latest improvements, the most prominent feature among which is the regeneration at the expense of the heat contained in the waste gases.

The retort-setting which was made the subject of experiment contained eight single retorts, and carbonized 6000 kilos. (5 tons 17 cwt.) of coal in 24 hours. The coal used was Saar coal, with a small percentage of English cannel, but the furnace was charged with the coke from the Saar coal only. The analysis of the coke is given as follows:—

Carbon	83·9 per cent.
Hydrogen	1·2 ,,
Ash	10·9 ,,
Oxygen and sulphur (determined by loss)	4·0 ,,

The quantity of coke consumed by the furnace was determined from the average of four days' working, all the coke used during this period being weighed into the furnace. 1080 kilos. (21 cwt.) were required per diem for heating purposes, or about 18 per cent. of the weight of coal carbonized. The clearing of the slit took place every 20 to 30 minutes, and there was no difficulty experienced in the melting and removal of the clinker. At the end of each 24 hours the clinker and ashes were collected, sorted, and weighed, and the residue was found to amount to 11·8 per cent. of the original weight of the coke, of which 4·3 per cent. was clinker, 2·2 per cent. fine ashes, and 5·3 per cent. small half-burnt coke.

The analyses of the waste gases taken at different periods showed that in the process of combustion an excess of air was sometimes present, while at other times there was a deficiency. The extreme variations were as follows:—

No. 1.—With Excess of Air.

Carbonic acid	16·0 per cent.
Oxygen	3·4 ,,
Nitrogen	80·6 ,,

No. 2.—With Deficiency of Air.

Carbonic acid	16·9 per cent.
Carbonic oxide	3·5 ,,
Nitrogen	79·6 ,,

The variation between these two conditions of working resulted from the differences in the area of the opening at the slit of the generator, this being least immediately preceding, and greatest immediately after the clearing of the slit. The average constitution of the generator gases was as follows:—

Carbonic acid	6·4 per cent.
Carbonic oxide	19·1 ,,
Nitrogen	74·5 ,,

The temperature of these gases could not be measured, but Dr. Bunte calculates it to be 1686° C. (3035° Fahr.), without allowing for loss by radiation. He remarks, however, that although this is the theoretical temperature, the average temperature of the gases must be much less, for not only is there loss through radiation, but the secondary air-flues, which pass through either side wall of the generator, carry off a large quantity of the heat developed.

By means of Table II. in the paper on "The Advantage of the Regenerative System," &c., read by Mr. G. Ernest Stevenson at the recent meeting of the British Association of Gas Managers at

Birmingham, the temperature may be calculated in the following manner:—

Heat Developed per Cubic Foot of Gases.

Carbonic acid	457 units × 0·064 = 29·248 units.
Carbonic oxide . . .	139 units × 0·191 = 26·549 „
Total	= 55·797 units.

The specific heat per *cubic foot* of the gases hydrogen, nitrogen, oxygen, carbonic oxide, as well as atmospheric air, works out at 0·018 unit, while that of carbonic acid is 0·025 unit; so that the nitrogen and carbonic oxide will absorb 0·745 + 0·191 × 0·018 = 0·0168 unit per degree Fahr., and the carbonic acid will absorb 0·0016 unit. Therefore, allowing 20 per cent. for the heat absorbed by the air-flues, and 10 per cent. for loss by radiation (which allowance Dr. Bunte considers sufficient), the temperature would work out at 2133° Fahr.—a figure which is probably more nearly correct than the estimate of Dr. Bunte. The temperature in the retort-setting, taken immediately under the crown of the arch, was 1416° C. (2549° Fahr.); that of the waste gases on leaving the setting was 1129° C. (2032° Fahr.) The secondary air supply became heated to 515° C. (927° Fahr.)

Taking Analysis No. 1, showing an excess of air, the proportion of air which passed through the generator, and that which formed the secondary air supply, is ascertained from the constitution of the generator gases in the following manner:—Each cubic foot of the generator gases contained 6·4 per cent. CO_2 + 19·1 per cent. CO. As the carbonic oxide possesses double the volume of the original oxygen, while the volume of the carbonic acid remains the same, there was required for the production of 1 cubic foot of the gases 1 − (0·191 ÷ 2) = 0·905 cubic foot of air.

In the secondary combustion there was the 0·191 cubic foot of carbonic oxide to be consumed, for which 0·191 ÷ 2 = 0·095 cubic foot of oxygen was required. Each cubic foot of oxygen being accompanied by 3·76 feet of nitrogen, we have 3·76 × 0·095 = 0·359 cubic foot nitrogen + 0·095 cubic foot of oxygen—together, 0·454 cubic foot of air. The waste gases contained, however, only 16 per cent. of carbonic acid and 3·4 per cent. of oxygen. There is, therefore, an excess of air to allow for, as follows:—

16 : 3·4 = 0·255* : x

x	= 0·054 cubic foot O.
0·054 × 3·76	= 0·204 „ „ N.
Excess of air per cubic foot of gases .	= 0·258 cubic foot.
Normal air supply	= 0·454 „ „
Total	= 0·712 cubic foot.

The proportion of air passing through the generator was therefore 56 per cent., and that consumed in the secondary combustion 44 per cent. of the total quantity used.

The next calculation of interest is the proportion of heat development in the generator and that due to the secondary combustion. In the production of 1 cubic foot of CO and CO_2, 0·0314 lb. of carbon is consumed [see Mr. Stevenson's paper, already referred to], and, as each cubic foot of the generator gases contained 0·255 foot of CO + CO_2, 0·008 lb. of carbon was subjected to combustion per foot of gases produced. The total heat development from 0·008 lb. of carbon would be 0·008 × 14,544 = 116·35 units; and, as 55·797 units were developed per cubic foot in the generator, the proportion is 48 per cent., leaving 52 per cent. to be developed in the secondary combustion.

In calculating the useful effect produced in the retort-setting, we have to take into consideration the reduction of heat in the generator due to loss by radiation and absorption by the secondary air channels, the initial temperature of the secondary combustion, and that of the waste gases as they issue from the setting. The secondary air supply, in passing along the sides of the generator, acquired a temperature of 515° C. (927° Fahr.), and the heat absorbed in raising them to this temperature is equal to 21·5 per cent. of the total heat developed in the generator. After passing along the sides of the generator, the air-flues go under the bottom retorts on either side of the setting, and the air is without doubt thus raised to a very high temperature. The heating of the air under the retorts cannot be regarded as regeneration, inasmuch as the temperature of the waste gases is taken after they have left the bottom retorts at their exit from the setting.

The heat developed in the generator being 55·797 units per cubic foot, and 21·5 per cent. being absorbed by the air supply, while 10 per cent. was dissipated through radiation, we have 38·221 units carried forward to the point of secondary combustion.

In Table II. of Mr. Stevenson's paper, 318 units are given as the heat development of 1 cubic foot of carbonic oxide burning to carbonic acid, and therefore as 0·191 cubic foot of carbonic oxide was present in the generator gases, the heat developed in the secondary combustion was 0·191 × 318 = 60·728 units. To this add the heat contained in the gases themselves = 38·221 units, and that brought forward by the air supply = 11·880† units, and we have as the total heat available for useful effect 110·829 units. Then we have the heat absorbed in raising the gases one degree in temperature, as follows:—

Carbonic acid	0·16	× 0·025	=	0·0040 unit.
Nitrogen . . .	0·806 } 0·84	× 0·018	=	0·0151 „
Oxygen . . .	0·034 }			
Total			=	0·0191 unit.

* As the gases contained 0·064 CO_2, and 0·191 CO, there is 0·255 cubic foot CO_2 present after the secondary combustion, for every cubic foot of generator gas consumed.

† 0·712 × 927 × 0·018 = 11·880 units.

The 110·944 units are now spread over a different volume of gases, for the 0·191 part of carbonic oxide is reduced to half its former volume, and the air supply is added to the volume of original gases; therefore 1 − (0·191 ÷ 2) = 0·905 + 0·712 = 1·617 cubic foot; then 110·829 ÷ (1·617 × 0·0191) = 3588° Fahr., which is the temperature of the secondary combustion.

The waste gases were found by Dr. Bunte to possess an average temperature of 1129° C. (2032° Fahr.), the minimum being 950° C. and the maximum 1710° C. Taking the average of 2032° Fahr., we have a useful effect produced of 43 per cent. of the total available heat effect—a result by no means satisfactory from a theoretical point of view, but which is explained by the high temperature at which the retorts were worked and the absence of regeneration.

Analysis No. 2 represents the alternative condition of working when there was an insufficient supply of air for the secondary combustion. The waste gases contained 16·9 per cent. of carbonic acid, and 3·5 per cent. of carbonic oxide. The generator gases being the same as before, we have—

Carbonic acid	0·064 cubic foot
Carbonic oxide	0·191 „
Nitrogen	0·745 „

If from the 0·191 cubic foot of carbonic oxide be deducted for non-consumed gas 0·044 cubic foot, we get 0·147 cubic foot to be converted into carbonic acid, for which purpose 0·147 ÷ 2 = 0·0735 foot of oxygen is required. The resultant gases are 0·064 + 0·147 = 0·211 cubic foot of carbonic acid, and 0·044 cubic foot of carbonic oxide. The nitrogen accompanying the oxygen is 0·0735 × 3·76 = 0·276 cubic foot, to which must be added the 0·745 cubic foot present in the generator gases, making a total of 1·021 cubic foot. Then the proportions of the effluent gases will be 16·5 per cent. of carbonic acid, 3·5 per cent. of carbonic oxide, and 80 per cent. of nitrogen, and their total volume will be 1·276 cubic foot for every cubic foot of generator gas consumed. This is almost exactly the constitution shown by Analysis No. 2.

The quantity of air used in the secondary combustion is 0·35 cubic foot, being a little less than half that consumed in the case of Analysis No. 1. The development of heat in this second instance is as follows:—

0·147 cubic foot of CO × 318	46·746 units.
Heat brought forward by generator gases and air, as before	50·101 „
Total heat effect	96·847 units.

The effluent gases possess the same specific heat as those in the case of Analysis No. 1, for the carbonic oxide present takes the place of the free oxygen in the first example, the volumes being equal within a decimal point, and therefore the temperature is 96·847 ÷ (1·276 × 0·0191) = 3973° Fahr.

In consequence of the higher initial temperature in the case of Analysis No. 2, the percentage of useful effect appears greater than in the former example. It must be borne in mind, however, that the whole of the heat energy was not developed, for whereas by complete combustion 110·944 units are brought to bear upon the retorts per cubic foot of heating gas generated in Analysis No. 2, the number of heat units is only 96·962, 13·982 units remaining latent in the effluent gases. It must consequently be admitted that the method of calculating the useful effect by the proportion between the theoretical initial temperature and that of the waste gases is only applicable when the combustion has been complete, and that, for all kinds of examples, it is better to go back to the number of heat units contained in the fuel, and compare with them the number lost by radiation and in the waste gases. If this be done in the foregoing examples, it will be seen that about 40 per cent. of the total heat effect of the fuel consumed was in each case turned to account. Further analyses were taken from time to time during a period of four months' working, and these analyses corresponded with those which have formed the bases of these calculations.

Dr. Bunte shows that if the air which is heated to 515° C. (927° Fahr.) obtained its heat from the waste gases by regeneration, instead of absorbing part of the heat produced in the generator, the useful effect would be 10 per cent. greater than under the present circumstances; that is to say, it would be 50 per cent. instead of 40 per cent. of the total heat effect. He considers it, however, quite possible to regenerate the air to double this temperature, or to heat it to 1000° C., by which, of course, very much more saving would be effected.

As regards the general working of the furnaces, Dr. Bunte characterizes them as *very satisfactory*, especially in regard to the economical manner in which the combustion takes place. The variations in the constitution of the waste gases he considers comparatively slight. The more carefully the slit of the generator is kept clear and of uniform area, the less variation will take place. The rate of air supply is fixed by valves at the entrance to the flues, and it depends on the speed at which the gas production takes place whether the air supply is excessive or insufficient. The depth of fuel in the furnace was not found to affect the rate of production to any appreciable extent, but the area of the slit had an immediate effect upon it.

Exhibition of Gas Cooking Appliances at Welshpool.—Under the auspices of the Welshpool Gas Company, an exhibition of gas cooking-stoves, water-boilers, and other apparatus, was held in the Market Hall, Welshpool, on the 29th and 30th ult., and on the 1st inst. On the last day of the exhibition a cook was in attendance, and practically illustrated the utility, cleanliness, and convenience of gas-stoves for cooking purposes; dinners being cooked in the morning from 11 till 1, and small cookery being done from 6 till 7.30 in the evening.

Notes.

The French Coal-Fields.

There are in France 57 centres of coal production scattered over 40 departments. The total output for 1880 of all these centres was 2,301,133 tonnes more than in 1879. The increase is relatively small in the class of lignites, or brown coal, but is chiefly made up in the classes of common coal and anthracite. The output of combustible minerals of all kinds in 1879 was 17,110,079 tonnes, and in 1880 this had risen to 19,412,112 tonnes. The greatest increase took place in the districts of the North and of the Pas-de-Calais, being over a million tonnes more last year than during the year before. The lignites are worked principally in the district of Provence, and the increase during the past year amounted only to 21,458 tonnes. The best coal in France comes from the districts of the North, the Pas-de-Calais, and the Loire, and all the pits in these localities are reported to be fully prepared for a greatly increased output if it should be required. The increased demand on the native coal-fields during the past year is stated by *Le Charbon* to be due to an improved state of general trade, particularly in the metallurgical industries. In spite, however, of the extended production of the French mines, the importation of coal from other countries, principally England, reached last year the total weight of 8,432,212 tonnes, or 800,000 tonnes more than in 1879, while the importations of coke showed a rise of 100,000 tonnes. Hence it appears that France is still compelled to import nearly one-half of the total quantity of coal consumed in the country. This necessity will, of course, continue so long as the quality of the native coal is inferior to that which is procurable from England at almost the same cost to the consumer. And therefore, though foreign competition is the favourite grievance of French coal owners, who maintain that but for it the entire requirements of the country might be supplied from within its own borders, it is clear that the real cause of the existence of competition from without is not sufficiently admitted by those interested in the native coal production.

The Prevention of Stoppages in Ascension-Pipes.

The last published Transactions of the Société Technique de l'Industrie du Gaz en France contain a note by M. Renaux on a plan he has introduced for preventing stoppages in ascension-pipes and in the hydraulic main. By its adoption M. Renaux claims to be able to get rid of all deposit of naphthaline, and produce gas of increased illuminating power. His plan is to evaporate upon the outer surfaces of the ascension-pipes a current of water which he causes to circulate round them. This is effected by the aid of a coil of iron wire wound round the pipes, over which about five quarts of water per hour are caused to flow. Upon the entire surface of the pipe a carbonaceous incrustation—a sort of spongy coke—is soon formed, and this assists in effecting the equal distribution of the water, which all evaporates before it reaches the top of the mouthpiece. A trial of the plan on a large scale at Toulon gave highly satisfactory results. It was found that the temperature of the pipes cooled in the way described during a six-hour charge ranged from 180° to 200° C. (356° to 392° Fahr.) at the commencement to 40° C. (104° Fahr.) at the end; the non-cooled pipes indicating temperatures ranging from 278° C. (532° Fahr.) to 81° C. (178° Fahr.) during the same period. These differences in temperature are, M. Renaux thinks, the real cause of the non-obstruction of the cooled pipes, as it is the decomposition of the tarry vapours in the non-cooled pipes which causes the deposition therein of pitch and naphthaline, and at the same time robs the gas of some of its illuminating power. In order that the distillation of coal may be carried on without these inconveniences, the temperature of the ascension-pipes should be kept as much under 100° C. (212° Fahr.) as possible; and if, after leaving the hydraulic main, the gas is allowed slowly to traverse a series of pipes laid upon the retort-ovens, and kept at a temperature of about 60° C. (140° Fahr.), the tar being deposited at the end of these pipes, and the gases and vapours passing on in the ordinary way, a gas of high illuminating power, and almost entirely free from naphthaline, is obtained. At Toulon the illuminating power of the gas is stated to have increased from 4 to 5 per cent., while naphthaline deposits almost entirely disappeared; and M. Renaux is of opinion that similar results may be obtained in other works by the adoption of his simple arrangement.

The Explosive Power of Coal-Dust.

Professor Abel has lately reported on certain experiments to determine the influence of coal-dust in promoting explosions and fires in mines. These experiments were instituted at the request of the Home Secretary, with a view to clear up some of the mystery which has hitherto surrounded explosions in mines wherein the ventilation has been considered good, and where there has been little evidence of the presence of fire-damp. It has now been found by Professor Abel that coal-dust in the atmosphere of mines not only much promotes and extends explosions, by means of the ready inflammability of the finely divided combustible, but it may also be brought into operation by itself as a fiercely burning agent, and will even operate as an explosive agent, through the medium of a proportion of fire-damp in the air, the existence of which would otherwise have been harmless. It also appears that any kind of dust in the explosive atmosphere of a coal mine, whether itself composed of inflammable material or not, is capable of facilitating in a peculiar manner the ignition and consequent explosion of fire-damp mixed in very small proportions with air. Although the explosion which may be caused by the agency of an incombustible gas in the manner stated, might at first be very feeble, it would probably be at once increased in magnitude and violence by the clouds of coal-dust which the first ignition would raise and put in action. The proportion of fire-damp required to bring dust in a mine into operation as a rapidly burning or explosive agent, even on a small scale and with a small igniting source of heat or flame, is considerably below the smallest amount that could be detected in an ordinary mine by the most experienced observer. In the complete absence of fire-damp, coal-dust exhibits a tendency to take fire even when passing, at a high velocity, a large lamp flame. If exposed to the action of a very large volume of fire, such as a flash of gunpowder or gun-cotton, it also exhibits a decided tendency to carry or propagate flame; but this tendency is of a limited nature, and very different from the property of carrying or extending flame which even incombustible dust possesses when in presence of a very small quantity of fire-damp. In a coal mine, or where gassy coal is stored, it can, however, be scarcely considered that the atmosphere is ever free from fire-damp; and so Professor Abel remarks that "as the existence of very small and unsuspected quantities of that gas in the air of a mine may suffice to bring about the ready propagation of flame by coal-dust, and thus to develop violent explosive effects, it would appear needless to assume that coal-dust may, in the entire absence of fire-damp, give rise to explosions, even of only limited character in coal mines, in order to account for casualties which cannot be ascribed to the existence of accumulations or sudden outbursts of fire-damp."

The Pumping Machinery of the Paris Water-Works.

A large pumping-station will shortly be erected at Ivry, in connection with the Paris water supply. The works will comprise two large rectangular buildings situated contiguously to each other, the one to contain the machinery and the other intended for the boilers. There will be six pumping-engines in the machine-room, which will measure 183 ft. 8 in. long and 78 ft. 8 in. wide. The boiler-room will be 167 ft. 3 in. long and 55 ft. 8 in. wide, and there will be 12 furnaces ranged in one line, of which 10 will belong to Farcot tubular boilers, and the others to Belleville generators. Behind the buildings two chimneys 114 ft. 9 in. high will serve to carry off the smoke. The machinery and boiler houses will have different ground levels, and as the natural ground line is very low, there will be a quantity of made soil to bring up the level of the approaches, courtyards, &c., to the required height. Ample coal stores will have to be provided, to guard against the possibility of a temporary failure in the supply. Three isolated pavilions will afford residences for the superintendent, chief engineer, and station-keeper; and a separate building will be provided for offices, storerooms and workshops. The estimated cost of the work will amount to about £55,000, and the structure and machinery of the establishment is expected to be very fine. There are no particulars as to the quantity of water that is to be lifted at the new pumping-station, nor the height to which it is to be raised; neither are we informed by the *Revue Industrielle*, from which the above particulars are taken, as to the estimated working expenses.

The Absorption of Gases by Solids.

Mr. J. B. Hannay recently read before the Royal Society a short preliminary statement regarding some observations he has made on the absorption of gases by solids. It appears that Mr. Hannay has been conducting certain experiments with gases enclosed under pressure in metallic cylinders and tubes; and in nine cases out of ten he has failed to keep the gas in the receiver, although the metal of the latter was sometimes two inches thick, and when tested by a powerful hydraulic press showed no leakage. Various linings were tried, the tube being electro-plated with copper, silver, and gold, but without success. Silicious linings were used—fusible enamels and glass, but still the tubes refused to hold the contents. It appears that glass, when at a temperature of 200° C., absorbs a large quantity of gas when the latter is under a pressure of 200 atmospheres. Oxygen and carbonic acid have been tried, and have always been found to be largely absorbed, and on cooling the glass under pressure the gas is retained permanently fixed. So much is absorbed that on quickly raising the temperature to the softening point of the glass, the sudden escape of gas raises the glass into a froth. On slowly raising the temperature to 300° C., most of the gas is quietly driven off without any visible action. The frothing up of the glass by the outrush of the contained gas is very striking. Other silicates, and also borates and phosphates, absorb gas, especially carbonic acid, under great pressure. Metals absorb more readily hydrogen and some of the hydrocarbons. Owing to the high pressures and temperatures needed to produce the required effect to the best advantage, and also to the fact of the majority of the experiments being failures, Mr. Hannay confesses to being only able to carry on his work very slowly, but he is still engaged in trying to arrive at quantitative results, which he proposes to announce when completed.

During the past few months there has been considerable agitation with respect to the price charged for gas by the Bromsgrove Gas Company, the price being 4s. 7d. per 1000 feet. The Directors of the Company have now issued notices to the consumers stating that in future the price will be—to consumers of 100,000 feet and upwards per annum, 3s. 6d. per 1000 feet; to consumers of 40,000 and under 100,000 feet, 3s. 9d. per 1000; and to consumers of less than 40,000 feet per annum, 4s. per 1000.

The Rating of the Harrogate Water-Works.—The Harrogate Water-Works Company have just appealed to the Assessment Committee of the Knaresborough Union against the rating of the water-works. The last assessment was £661. The new assessment, made on the valuation of Messrs. Hedley and Son, of Sunderland, was £2320. The Committee reduced the latter amount to £2153.

Parliamentary Intelligence.

PRIVATE BILLS RELATING TO GAS, WATER, ETC.—SESSION 1881.

PROGRESS MADE TO SATURDAY, JULY 9.

Title of Bill.		Petition for Bill Presented.	Bill Read the First Time.	Bill Read a Second Time.	Bill Reported.	Bill Read the Third Time.	Bill Received Royal Assent.
Aberdeen Corporation Bill	Lords	Commons Bill	March 29	April 7	May 13	May 31	June 27
"	Commons	Jan. 27	Jan. 28	Feb. 2	March 8	March 28	
Alnwick Gas Bill	Lords	Commons Bill	May 5	May 13	May 19	May 23	June 3
"	Commons	Jan. 27	Jan. 28	Feb. 7	April 5	April 28	
Barrow-in-Furness Corporation Bill	Lords	Commons Bill	May 5	June 13	June 21	June 28	..
"	Commons	Jan. 27	Jan. 28	Feb. 2	April 8	May 3	..
Beverley Water Bill	Lords	Commons Bill	April 8	May 12	June 17	June 23	..
"	Commons	Feb. 4	Feb. 7	Feb. 15	March 22	April 7	..
Bingley Water and Improvement Bill	Lords	Commons Bill	March 25	April 4	May 31	June 3	June 27
	Commons	Jan. 27	Jan. 28	Feb. 2	March 11	March 24	
Birkenhead Corporation (Gas and Water) Bill	Lords	Commons Bill	April 8	June 2	July 1	July 5	..
	Commons	Jan. 31	Feb. 2	Feb. 7	March 23	April 7	..
Bradford Water and Improvement Bill	Lords	Commons Bill	April 8	May 19	June 27	June 30	..
	Commons	Jan. 27	Jan. 28	Feb. 4	March 18	April 8	..
Bray Township Bill	Lords	Feb. 18	Feb. 18	Feb. 25	May 24	May 31	..
"	Commons	Lords Bill	June 2	June 20	July 8	..	..
Brighton and Hove Gas Bill	Lords	Commons Bill	March 15	June 28	..	..	..
" "	Commons	Jan. 27	Jan. 28	Feb. 14	March 3	March 14	..
Cambridge University and Town Gas Bill	Lords	Commons Bill	March 11	March 21	March 22	March 25	March 29
	Commons	Jan. 27	Jan. 28	Feb. 7	March 1	March 10	
Caterham Spring Water Bill	Lords	Commons Bill	June 13	June 14	..	..	..
" "	Commons	April 29	May 11	May 23	May 31	June 13	..
Cheltenham Corporation Water Bill	Lords	Commons Bill	May 6	May 16	May 27	May 31	June 27
"	Commons	Jan. 27	Jan. 28	Feb. 2	April 5	May 5	
Cleator Moor Local Board Bill	Lords	Commons Bill	May 5	May 13	May 27	May 31	June 27
" "	Commons	Jan. 27	Feb. 7	Feb. 14	March 15	April 25	
Colne and Marsden Local Board Bill.	Lords	Jan. 28	Jan. 28	Feb. 3	March 15	March 21	June 27
"	Commons	Lords Bill.	March 28	May 23	June 3	June 17	
Dudley Gas Bill	Lords	Commons Bill	April 1	April 8	May 24	May 30	June 27
"	Commons	Feb. 2	Feb. 3	Feb. 15	March 22	March 31	
Dundalk Water Bill	Lords						
"	Commons	Jan. 28	Jan. 31	Put off for	six months		
Eastbourne Water Bill	Lords	Commons Bill	April 5	May 12	May 19	May 23	June 3
"	Commons	Jan. 27	Jan. 28	Feb. 15	March 18	April 4	
East London Water Bill.	Lords	Jan. 28	Jan. 28	Feb. 8	March 7	March 11	..
" "	Commons	Lords Bill	March 14	March 23	July 6	..	..
Egremont Local Board Bill.	Lords	Commons Bill	April 5	May 9	June 24	June 30	..
"	Commons	Jan. 27	Jan. 28	Feb. 2	March 11	April 4	..
Fylde Water Bill	Lords	Commons Bill	March 31	April 8	May 10	May 13	June 3
"	Commons	Jan. 27	Jan. 28	Feb. 9	March 18	March 29	
Goole and District Gas and Water Bill	Lords	Commons Bill	May 5	May 13	May 20	May 24	June 27
	Commons	Jan. 27	Jan. 28	Feb. 8	March 18	April 25	
Hexham Gas Bill	Lords	Commons Bill	March 31	April 8	May 10	May 13	June 3
"	Commons	Jan. 28	Jan. 31	March 2	March 18	March 29	
Holland (Parts of) and Sutton Bridge Water Bill	Lords	Commons Bill	April 1	May 23	June 28	July 1	..
	Commons	Jan. 31	Feb. 2	Feb. 7	March 22	March 31	..
Hyde Gas Bill	Lords	Commons Bill	April 7	May 9	May 17	May 27	June 3
"	Commons	Jan. 28	Jan. 31	Feb. 14	March 25	April 5	
Irvine Burgh Bill	Lords	Commons Bill	May 17	May 27	May 31	June 3	June 27
"	Commons	Jan. 31	Feb. 2	Feb. 7	April 1	May 16	
Kirkcaldy and Dysart Water Bill	Lords	Commons Bill	May 13	May 24	May 27	May 30	June 3
" "	Commons	Jan. 28	Jan. 31	Feb. 7	April 1	May 12	
London Sea Water Supply Bill	Lords	Commons Bill	June 2	June 14	June 20	June 24	..
" "	Commons	Jan. 28	Jan. 31	March 14	May 24	June 2	..
Lower Thames Valley Main Sewerage Board Bill	Lords	Jan. 28	Jan. 28	Feb. 1	Preamble	not proved.	
	Commons						
Matlock Water Bill	Lords	Commons Bill	April 1	May 24	May 27	May 31	June 27
"	Commons	Jan. 27	Jan. 28	March 2	March 22	March 31	
Oban Burgh Bill	Lords	Jan. 28	Jan. 28	Feb. 1	March 11	March 22	..
"	Commons	Lords Bill	March 25	April 4	July 8	..	..
Paisley Water Bill	Lords	Commons Bill	March 22	March 31	April 5	May 5	June 3
"	Commons	Jan. 27	Jan. 28	Feb. 4	March 4	March 21	
Reading Corporation Bill	Lords	Commons Bill	May 27	June 3	July 4	..	..
"	Commons	Jan. 27	Jan. 28	Feb. 4	April 8	May 26	..
Richmond Gas Bill	Lords	Commons Bill	March 29	April 7	May 12	May 16	June 3
"	Commons	Jan. 27	Jan. 28	Feb. 7	March 15	March 28	
Ryton Local Board (Water) Bill	Lords	Commons Bill	March 25	April 4	April 5	May 31	June 27
"	Commons	Jan. 31	Feb. 2	Feb. 7	March 15	March 24	
Sevenoaks Gas Bill	Lords	Commons Bill	March 22	April 4	April 5	April 8	June 3
"	Commons	Jan. 31	Feb. 2	Feb. 21	March 15	March 21	
Sheffield Water Bill	Lords	Commons Bill	March 11	March 21	March 31	April 4	June 3
"	Commons	Jan. 27	Jan. 28	Feb. 7	March 1	March 10	
South Metropolitan Gas Bill	Lords	Commons Bill	May 31	June 13	July 8	..	..
" "	Commons	Jan. 27	Jan. 28	March 4	May 20	May 31	..
Stalybridge Extension and Improvement Bill	Lords	Commons Bill	May 19	May 30	June 17	..	..
	Commons	Jan. 28	Jan. 31	Feb. 7	March 15	May 17	..
Stirling Water Bill	Lords	Commons Bill	May 31	June 14	June 24	June 30	..
"	Commons	Jan. 31	Feb. 2	Feb. 7	May 24	May 31	..
Westbury-on-Trym Gas (No. 1) Bill	Commons	Jan. 27	Jan. 28	Feb. 4	Bill withdrawn		
Westbury-on-Trym Gas (No. 2) Bill	Commons	Jan. 27	Jan. 28	Feb. 7	Bill withdrawn		
Westgate and Birchington Gas Bill.	Lords	Commons Bill	March 24	April 7	April 8	May 6	June 3
" "	Commons	Jan. 28	Jan. 31	Feb. 7	March 11	March 22	
Woking Water and Gas Bill	Lords	Commons Bill	May 31	June 13	June 23	June 28	..
" "	Commons	Jan. 28	Jan. 31	Feb. 7	May 17	May 30	..

HOUSE OF COMMONS.

MONDAY, JULY 4.

THE USE OF GAS IN LIGHTHOUSES.

Mr. GRAY asked the President of the Board of Trade whether the system of illuminating lighthouses by gas, patented by Mr. Wigham, of Dublin, had been strongly recommended by Sir William Thomson, F.R.S., Admiral Sir Leopold M'Clintock, and Professor Tyndall, scientific adviser to the Board of Trade, the Trinity House, and the Board of Irish Lights, and by other high authorities, and strong testimony given in its favour by seamen and other qualified observers; whether the Trinity House, in January, 1875, recommended the further development of the system in Ireland; whether, with one exception, no lighthouse had since been lighted under this system either in England or Ireland; whether this was due to the opposition of the Messrs. Douglass, Engineers to the Trinity House and the Board of Irish Lights; whether the Mr. Douglass, Engineer to the Board of Irish Lights, was brother to the Mr. Douglass, Engineer to the Trinity House; and whether he would consider how far the development of an improved system of lighthouse illumination might be arrested by official opposition.

Mr. CHAMBERLAIN replied that despatches had been received from the gentlemen whose names were mentioned in the question, who were in favour of the illumination of lighthouses by gas, but it must not be understood that these testimonials were in favour of the system referred to, to the exclusion of every other system. It was the case that on Jan. 8, 1875, the Trinity House, yielding its own opinion a little, he thought, in deference to the recommendations of the Irish Lights Commissioners, did consent to recommend the development of this particular system in Ireland. Since then one lighthouse had been lighted with gas at Galley Head, and another at Copeland's Islands. Proposals had also been made and considered in reference to Ballock Point and Tory Island, and in December, 1878, the Irish Lights Commissioners suggested that further consideration of the subject should be postponed; and subsequently the proposal with regard to Ballock Point was withdrawn, and estimates in reference to Tory Island were being prepared. As to the other three questions put by the honourable member, he regretted that they should be asked, because they seemed to bring imputations to bear on some honoured and trusted public servants. Messrs. Douglass were brothers, and it was, of course, their duty from time to time to offer their opinion upon the different systems of lighting; but there was no reason to believe

they had exceeded their duty in this respect, and the responsibility rested entirely upon the respective Boards.

TUESDAY, JULY 5.

A petition in favour of the Oban Burgh Bill (Lords) was presented from ratepayers and inhabitants of Oban.

HOUSE OF LORDS.

TUESDAY, JULY 5.

The Order made on Friday, the 1st inst., referring the Brighton and Hove Gas Bill to a Select Committee, was discharged, and the Bill withdrawn from the group. [The reason for this is that the amendments made in the Bill since it left the House of Commons, and referred to in our editorial columns last week, necessitate its being submitted to meetings of the Shareholders in both the Companies interested.]

GAS PROVISIONAL ORDERS BILL.—This Bill was read the third time, with the amendments, passed, and sent to the Commons.

FRIDAY, JULY 8.

The Brighton and Hove Gas Bill was referred to a Select Committee, consisting of Earl Beauchamp (Chairman), Earl Pembroke and Montgomery, Earl Bathurst, Lord Ribblesdale, and Lord Ampthill; to meet on Tuesday, July 12.

HOUSE OF LORDS COMMITTEE.

TUESDAY, JULY 5.

(*Before Lord* MONTEAGLE, *Chairman; Earl* HAREWOOD, *Lord* BALFOUR OF BURLEY, *Lord* BELPER, *and the Marquis of* BRISTOL.)

SOUTH METROPOLITAN GAS BILL.

Sir E. BECKETT, Q.C., Mr. MICHAEL, Q.C., Mr. CHANDOS LEIGH, Q.C., and Mr. O'HARA, appeared for the promoters; Mr. BIDDER, Q.C., Mr. LEDGARD, and Mr. C. A. CRIPPS for the Metropolitan Board of Works; Mr. SAUNDERS, Q.C., and Mr. SHIRESS WILL for Messrs. Lewis and Hyam and the Biphosphated Guano Company, Limited, petitioners against the Bill.

Sir. E. BECKETT, in opening the case for the promoters, said the object of the Bill was to enable the South Metropolitan Gas Company to raise additional capital for extending their works, and also to empower them to remove as much of their plant as possible to a more unpleasant part of the country than that which they occupied at present; thereby following the example of The Gaslight and Coke Company. He thought it might be taken that the preamble of the present Bill was unopposed, because the only point in dispute appeared to be the powers to create further capital. When the Bill was before the House of Commons it was proposed to raise £1,500,000 in addition to the £2,000,000 at present possessed by the Company; but this was objected to as too much. He (Sir E. Beckett) really did not know why it was that the Metropolitan Board of Works thought it worth while to be continually incurring legal expenses by objecting to increased capital, which really caused the gas companies to apply to Parliament and spend more money within perhaps five years instead of ten. The additional capital asked for having, however, been reduced to £900,000 in the House of Commons, he thought no question would be again raised on the point.

Mr. BIDDER intimated that a further reduction would be sought for.

Sir E. BECKETT said that having got something, the Metropolitan Board were trying to get something more; but this was not really the point they were contending for, as he should shortly explain. It would be necessary to give a general history of gas legislation for some years. The learned Counsel having given a summary of the various proceedings in connection with gas legislation in the Metropolis from 1860, said that the Metropolitan Board of Works appeared to have been thinking all along that they had been very clever in their constant interference with the gas companies; but he would mention what the outcome had proved to be last year. If they had only been quiet, the result would have been that the operation of the common rules of Parliament, and the rules imposed upon all companies with existing capital, and who were seeking to raise new capital, would have produced a benefit to the public to the extent of £100,000 a year compared with the legislation which had been the result of the cobbling of the Metropolitan Board of Works. They know this perfectly well, because it had been proved beyond all question; but they were now trying to cobble again, for they always had some nostrum in their heads. They thought they knew better than anybody else what was good for the public, and they always turned out to be wrong. In 1875 a gas inquiry of a very special kind was instituted; for the House of Commons at that date, as also in 1867 and 1868, had given them the very best and most able Chairmen they could find—viz., Mr. Cardwell in 1867, and Mr. Forster in 1875. Both these gentlemen took an enormous amount of pains with the Bills, and certainly they could not be said to have been influenced by any prejudice in favour of the gas companies; but Mr. Forster and his Committee adopted substantially the very scheme suggested by the Metropolitan Board itself, striking out of it, however, a most unjust and flagrant proposition which they sought to introduce—against which even the Board of Trade protested, and said that nothing could be more monstrous or more prejudicial than the system called the sliding scale, which was a proposition which really made the scale slide in their favour and never against them. Every advantage that could be obtained by the sliding scale they were to have, but to everything that could possibly tell against them and in favour of the gas companies they were decidedly averse. He would endeavour to explain what the sliding scale system was. The Board tried a fixed price, and they did not like it; they tried a limitation of dividend, and they did not like it; they tried a revision which should enable the gas companies to approach, but not to exceed a fixed lividend, and they did not like that. Then they said, "All these things do not give any inducement to the gas companies to work economically. Let us fix an initial price, as it is called." The scheme they proposed was that if, by good management, any of the metropolitan companies could afford to reduce the price of their gas below 3s. 9d. per 1000 feet, for every reduction of 1d. per 1000 they might have 5s. per cent. more dividend. For some time the gas companies were rather frightened at this, and said among themselves, "This sounds very nice, but we have the coal famine of the last few years still staring us in the face. Things may get worse; and it may happen that we may never be able to reduce our price. We cannot raise our price without sacrificing at the same time, because if we raise our price we are to reduce our dividend." This sounded most alarming, but there was a very able gentleman connected with the South Metropolitan Company, who said he was quite satisfied with the arrangement, and the result was, after a good deal of discussion, that the other companies gave in. But there was this essential element stated by Mr. Livesey and by everybody else—viz., "If we are to submit to this, it is perfectly evident that the thing must be settled for ever. We must know this is to be final, because if we are to have an initial price, and then, after you have tempted us to better management, and to lower our price, with the view of increasing our dividend, it would be most disgraceful if you were to come afterwards, when you find that we are getting a benefit, and say that the initial price is fixed too high." Mr. Forster agreed with this, and repeated it in the strongest language over and over again. Mr. Burke, who was then Chairman of the Imperial Gas Company, also said: "If I could ensure that the Board of Works would keep good faith with me, and say it shall remain always the law, I would say, grant it at once, and I will accept it from a conviction in my own mind that in the course of time the price of gas will go down from a variety of circumstances." On the following day a clause was handed in by the promoters—the Metropolitan Board—"The standard price to be charged shall be for common gas 3s. 9d. per 1000 cubic feet," after which Mr. Cripps said: "It is intended to have a special clause with regard to the South Metropolitan"—this was a specimen of the Metropolitan Board of Works legislation—"because the 3s. 9d. we consider to be too high a price for a company which has been charging 3s., and which by existing legislation is limited not to charge more than 3s. 6d." This was the way, again, in which they were to take advantage of everything that had occurred in their favour, but of nothing that had occurred the other way. The Chairman, however, said: "We are prepared to accept the principle of a sliding scale, but we think it must be uniformly applied to all the companies." A member of the Committeee thought it necessary to say the same thing, but he added a phrase which was not unimportant: "The impression upon my mind has been that there has been an uneasy feeling, not only that Parliament may eventually interfere, but that there may be pressure put upon Parliament to interfere." Mr. Talbot, another member of the Committee, stated that "there are people bringing in Bills which do not pass; but still the bringing in of Bills is sufficient to agitate and disturb the minds of the people against those to whom they are directed;" and this was what had actually happened. Mr. Cripps likewise stated: "It seems to me to have as much promise of finality as any arrangement can have;" and a good deal more to the same effect. Passing on to 1876, in that year the South Metropolitan Company had a Bill of their own in Parliament, and for once the Metropolitan Board really had a lucid interval of honesty, which was the only one he (Sir E. Beckett) had ever known them to have. One of the unknown people Mr. Talbot had alluded to in 1875, tried to get the initial price altered, and he actually found a Committee of five members of Parliament to say: "Well, the South Metropolitan Company are charging now, and were charging before the time of Mr. Forster's Committee, 3s. 6d. per 1000 feet; and although Mr. Forster's Committee were in favour of uniformity, we think otherwise." This was a kind of thing that even members of Parliament did every now and then; so that there was no kind of security. The South Metropolitan Company, in spite of the solemn declaration of Mr. Forster and his Committee, and of the Metropolitan Board themselves, had their price cut down. Here were the Metropolitan Board again. Their lucid interval had passed off, and they were not at all ashamed, but were, after all that had been said in 1875 and 1876, again trying to reduce the Company's initial price. But although the lucid interval had passed off from the Board as a whole, they were by no means wholly corrupt. There were left in Israel two or three who had slightly different views. Even the Parliamentary Committee of the Metropolitan Board, to whom the matter was referred, would not go quite the "whole hog" with them; for they said positively: "Your Committee do not consider it desirable to raise again at the present time the question of the initial price, but they recommend that a petition be presented to the House of Lords, asking for a reduction of the amount of capital authorized by the Bill as passed by the Select Committee of the House of Commons." No fault could be found with this; they were within their rights, and no question of honesty was involved.

Mr. BIDDER: If my learned friend would assume once and for all that we are thoroughly dishonest, it would save him the trouble of repeating it so often.

Sir E. BECKETT said he had been assuming it. He had to convince people who did not know the Metropolitan Board of Works as he did, after an experience of 25 years. There was no question as regarded the meaning of the Parliamentary Committee of the Metropolitan Board—that they thought it was not fair for them, at any rate, to raise this question of the initial price.

Lord BALFOUR: What date is that?

Sir E. BECKETT said it was on May 28 of this very year, since the Bill left the House of Commons. Then there was a Mr. Rogers, who was known as one of the advanced spirits of the Metropolitan Board who, when the question came before the whole Board, said that he thought the Committee should again be empowered to raise the question of initial price, and moved as an amendment the omission of that part of the Parliamentary Committee's recommendation coming after the word "Lords"—in other words, to negative the recommendation. This amendment was seconded by Mr. Richardson, whom, on a former occasion he (Sir E. Beckett) had to call by the complimentary name (he really meant it as a compliment) of the "calculating boy" of the Metropolitan Board of Works, because whenever there was a bit of financial conjuring to be done Mr. Richardson was the man who did it. This gentleman said "it was quite true there was a contract, and he should be very unwilling to attempt to break that contract, but it was made when the South Metropolitan was a Company with a capital of £350,000, having, comparatively speaking, a very small area. Since that time they had amalgamated with a Company about three times their size (the Phœnix), and also with the Surrey Consumers'. Their capital was now close upon £2,500,000, and they asked in this Bill for £2,500,000 more. No one could pretend that there was any contract made with the old Phœnix Company or with the Surrey Consumers'. This Company now supplied a very large area, and the Board were bound to do what they could in the interests of the consumers. He hoped the matter would be allowed to go back to the Committee, with authority to act upon their own judgment in regard to the question of initial price." Perhaps he (Sir E. Beckett) had better at once deal with this shabby excuse—he must use a stronger word, this false pretence, and he would say why he used this word. At the very time when the Act of 1875 was passed, the amalgamation principle has been suggested to all the gas companies, and as far as possible imposed upon them at the request of the Metropolitan Board; but Mr. Cardwell, in 1868, and Mr. Forster in 1875, said that the initial price of 3s. 9d. per 1000, and the principle of the sliding scale, ought to be applied to every company. In other words, as soon as the Phœnix Company and the Surrey Consumers' Company, under the legislation of 1868, with the authority of the Board of Trade, came into the amalgamation, they necessarily came into the principle of the initial price of 3s. 9d., which Mr. Forster and his Committee had said ought to be uniform and universal.

The CHAIRMAN inquired whether the companies were amalgamated by an Act of the South Metropolitan Company.

Sir E. BECKETT said they were amalgamated under an Act of Parliament, but not by it; it was by the General Act, which was better still. If the companies had been amalgamated by an Act of Parliament subsequently, then Mr. Richardson and his fellows might have come and said anything they liked. But the Act under which they were amalgamated was actually existing and in action at the very time when Mr. Forster was legislating; and Mr. Richardson and the Metropolitan Board knew perfectly well, as they had been always urging amalgamation, and Mr. Cardwell had urged

it, that the companies had power to amalgamate with the authority of the Board of Trade.

Mr. BIDDER: As a matter of fact, you are wrong.

Sir E. BECKETT said clause 18 of the Act of 1868, stated: "The Companies may, as soon as may be after the expiration of six months from the passing of this Act, settle a scheme for the amalgamation of the companies, or some of them, and shall submit the same to the Board of Trade, and such scheme shall be framed with a view to the reduction of the expenditure of the companies."

The CHAIRMAN: Is that a private Act?

Sir E. BECKETT: It applies to the whole of the Metropolis.

Mr. BIDDER said his learned friend was quite wrong. The section he was reading had no application to the South Metropolitan Company at all, but applied to certain other companies. The power of amalgamation under which the southern companies were amalgamated was not passed by Parliament until after Mr. Forster sat in 1876. The companies referred to in the Act of 1868 were defined in the interpretation clause.

The CHAIRMAN (referring to the Act) said that the term "companies" and "company" meant The Gaslight and Coke Company, the City of London Gaslight and Coke Company, and the Great Central Gas Consumers' Company.

Sir E. BECKETT said that certainly these were the three companies supplying the City, but they were doing a great deal more, because they ran a very long way outside the City. He had not, however, yet dealt with the south of London. All he had said was that Mr. Cardwell's report suggested an amalgamation. In 1868 Mr. Cardwell did all he could with regard to the companies that were then before him, but the companies in the south of London were not before him, and therefore he did nothing with respect to them. Mr. Forster, however, knew perfectly well that this was the principle, and that as soon as possible the amalgamation principle would be extended to them. He (Sir E. Beckett) said he would lay before their lordships the amalgamation clauses of the Act of 1876, which would show that the South Metropolitan Company might at any time amalgamate with any other gas company supplying gas on the south side of the Thames. This provision was put in after the evidence had been given—not a mere thing adopted in a hurry, but after evidence had been given in favour of amalgamation, after the Board of Trade had recommended amalgamation, after Mr. Cardwell's report and all that was founded upon it, and after Mr. Cardwell's Act with regard to the great Company on the north of London. If their lordships would then turn to clause 21 of the Act of 1876, they would find the alteration he had been speaking of—namely, fixing 3s. 6d. instead of 3s. 9d. per 1000 feet as the initial price.

The CHAIRMAN: I see that is clear enough—it was to be 3s. 6d.

Sir E. BECKETT said he had then to hand in, so that there might be no mistake, the evidence of Mr. F. J. Bramwell, the well-known engineer, in favour of amalgamation, in order to show that there could not have been any possible pretext for the contention of Mr. Richardson that the amalgamation was a thing that came upon him by surprise. There was also another gentleman, a well-known member of the Metropolitan Board—a Mr. Runtz—who alluded to the circumstances under which the sliding scale was embodied in the more recent Acts relating to the Metropolitan Gas Companies, dwelling particularly upon the fact that ever since it became law the price of gas had been going down. It had made economy the great object of all the gas companies, and in consequence gas was, he said, never cheaper than at the present time. He (Sir E. Beckett) was glad to give Mr. Runtz the credit of what he was going to read. This gentleman said: "It would be a great breach of faith with the investing public if the Board now attempted to obtain a reduction in the initial price." Mr. Runtz was an honest man. He not merely had a lucid interval of a year, but his honesty had lasted five years, and it was to be hoped it would last a good while longer. Then another gentleman—one who was hovering between honesty and dishonesty—said: "The question was whether, after the proceedings of 1876, it would be prudent for the Board"—not honest, but prudent—"again to raise the question of initial price at so early a date."

Mr. BIDDER: I think it is a pity to talk about gentlemen hovering between honesty and dishonesty.

The CHAIRMAN: I think it bears upon the subject.

Mr. BIDDER: If your lordship thinks that my learned friend has a right to give his opinion upon their honesty or dishonesty as he pleases, I do not object; but really I do not think it is usual in these rooms to charge people with dishonesty, or hovering between honesty and dishonesty.

Sir E. BECKETT; I entirely agree with you. I never met with such a case before, but I find this very opponent says it would be a great breach of faith, and it is not a very great step from that to dishonesty.

The CHAIRMAN: We all know that the Metropolitan Board of Works do not do it for their own personal interests.

Sir E. BECKETT said he was afraid that people who did not do things for their own personal interest were sometimes less scrupulous than those who did. He did not mean to charge any one with personal dishonesty in that sense.

The CHAIRMAN: I think you had better go on upon the main subject.

Sir E. BECKETT read the Order of the Queen in Council authorizing the amalgamations, and also several extracts from the Memorandum by the Board of Trade, presented to the House of Lords, in reply to an Order dated July 25, 1876, stating, amongst other things, that there was every prospect that there would be two amalgamated Companies—one to the north (this was the Chartered) and one to the south of the Thames (this was the South Metropolitan, *plus* the Phœnix, and *plus* the Surrey Consumers'), and that thus the long and vexed question of metropolitan gas supply would be satisfactorily settled; and, in the face of this, he again asked if Mr. Richardson would have the audacity to say that the amalgamation of the companies in any way took him by surprise, for it was done after he had supported the legislation of 1876, and of 1875, and of 1868. It was not often that the Board of Trade were inclined, even upon pressure, to come into a parliamentary committee-room and express any view of their own; but he (Sir E. Beckett) was informed that the Board felt that there was so much injustice involved in the present case that Mr. Farrer was prepared to attend if their lordships wished to hear him. Of course he did not mean to make himself in any sense a witness for the Company, but if there was any lingering doubt upon the minds of the Committee as to whether there was a settlement which was honestly bound to be adhered to, Mr. Farrer was willing to come and tell their lordships the views of the Board of Trade, even under a very altered Government, of course, from that of 1876. He also understood that even Mr. Forster was willing to come before their lordships, if necessary.

The CHAIRMAN said he did not see there was any necessity for deciding the matter at present. If the Committee wished to see these gentlemen they would call for them.

Mr. SAUNDERS, in reply to the Chairman, said he appeared upon the petition of Messrs. Hyam and others.

Sir E. BECKETT said there was a portion of land on the Greenwich Marshes which the petitioners wished to force the Company to take, and they could bring up a clause to this effect if they liked, and he would argue it at the proper time.

The CHAIRMAN: That is to say, you want to take some of their land, but not all.

Sir E. BECKETT: Not a bit of it; but they want us to take it.

Mr. SAUNDERS: I contend that the Company are not to have the power to take any portion of the land around us, and destroy it, without taking ours.

Sir E. BECKETT: You have no *locus standi* upon that.

Mr. SAUNDERS: I object to the whole of the preamble.

The CHAIRMAN: I suppose Mr. Saunders wants you to take all or none.

Mr. SAUNDERS: No; it is not quite that.

The CHAIRMAN: Surely he may say, "Do not take my land because the Bill is not necessary, and is not going to prove for the public benefit."

Sir E. BECKETT: But that is not what he says. He does not say "Do not take my land," but "Do not take other people's land;" and he has no right to say that for a moment.

The following witness was then called:—

Mr. *George Livesey*, examined by Mr. MICHAEL.

I have been Engineer to the South Metropolitan Gas Company for about 20 years, and am also Secretary at the present time. I am thoroughly acquainted with all that has taken place with regard to gas legislation since 1860, in which year a large number of companies were supplying gas in the Metropolis, while at the present time the whole of the north may be said to be supplied by two companies—The Gaslight and Coke and the Commercial, and the south to be entirely supplied by the South Metropolitan Gas Company, there being besides one company—the London—which supplies a portion both of the north and of the south. [Witness pointed out on a map the districts of the various companies as now arranged.] The total capital of the South Metropolitan Gas Company at present is £2,032,000; and the total quantity of gas made during last year was, in round numbers, 3800 million cubic feet. During the last twelve months the increase has been 8·7 per cent. The make of gas in 1880 was 87 per cent. more than it was ten years previously, and has therefore been about 8 per cent. cumulatively. Our consumption has increased rather more than that of the London companies generally. The increase of the London gas supply during the ten years, taking the whole of the companies, is 78 per cent., including our own. The standard price fixed by our Act for the supply of gas is 3s. 6d. per 1000 cubic feet, with the auction clauses. The Commercial Company's price is 3s. 9d. without the auction clauses, and the Chartered 3s. 9d. with the auction clauses. The amount of capital raised within the last two years by our Company has been between £180,000 and £200,000; but only £30,000 of this was raised under the auction clauses, the greater part being capital belonging to the other companies. The £30,000 was sold in January of this year, and realized £55,400; consequently there was £25,400 which went into capital bearing no dividend. Previously to 1876 we existed as the South Metropolitan Gas Company simply, without any amalgamation. I have taken part in the discussions from time to time before the various Committees which were appointed by Parliament for the investigation of the metropolitan gas question, and I remember the Act passed in 1868, called the City of London Gas Act, which recommended the amalgamation of the companies on the north. I also remember that, from time to time, the Board of Trade urged, as one of the settlements of the gas question, the desirability of having one or two companies, at the most, for supplying gas on the north, and, if possible, one or two for the supply of gas on the south of the Thames, and the Board of Trade have pursued this policy persistently and consistently during the last ten years, and are now pursuing it. The result generally of carrying out the process of amalgamation has brought the companies, in the first place, under one uniform system. The gas is tested day by day and night by night for illuminating power and purity. By these amalgamations the companies which have not gone to Parliament, having been amalgamated with those having powers for the purpose, are now compelled to supply 16-candle gas instead of 12-candle gas, as under the old Act of 1860; and, in conjunction with the sliding scale, it has resulted in considerable reductions of price to the consumers all over the Metropolis. In 1875, the Metropolitan Board of Works and the Board of Trade again urged the desirability of amalgamation, and the matter then for the first time came before Parliament with regard to the desirability of adopting a sliding scale. The Metropolitan Board of Works were not the first to propose the sliding scale; they proposed simply that it should extend in one direction only—that there should be a diminution of dividend with an increase of price, but no increase of dividend if the price were reduced. It was, however, eventually passed, as the best mode of solving the difficulty, that there should be a sliding scale giving for each 1d. of increase a diminution of 5s. per cent., and for every 1d. diminution in price an increase of 5s. per cent. The amount of capital expended by a company in relation to each ton of coals carbonized is an important factor in regard to the price of gas; because on this depends the dividend, and the dividend must, to some extent, regulate the price. In our amalgamated Company the capital per ton of coals is £5 0s. 9d., which is rather low compared with the other companies. In the case of The Gaslight and Coke Company, for instance, the amount of capital is £7 17s. per ton; the Commercial Company, £4 19s. 9d.; and the London, £5 10s. 6d. At the time the Board of Trade and the Metropolitan Board of Works were before Parliament in 1875, a main element which they urged before the Committee was having a uniform price over the whole of the Metropolis. The price of 3s. 9d. per 1000 was then considered fair, and if the companies had been sufficiently sensible to have accepted it, this would have been the uniform price all over London. My Company, unfortunately, did not. The maximum price in the Act governing the South Metropolitan Gas Company before the amalgamation was 3s. 6d. per 1000 cubic feet, with the revision clauses, which enabled us, if we were not able to earn our full dividend at the price, to apply to the Board of Trade to appoint Commissioners to give us such a price as, with due care and management, would ensure full dividends to us. We, however, never applied for an extension of price, although other companies had to do so. Although the coal famine pressed heavily upon us, as it had upon other gas companies, we continued under our maximum price of 3s. 6d., thinking that by this means we should earn the good-will of the public. In 1876 we applied to Parliament for various powers, and amongst other things we adopted the amalgamation clauses of 1868, giving us power to amalgamate with other companies on the south of the Thames, and we have carried this out. On that occasion an opposition was raised to our having the same uniform price of 3s. 9d. which obtained on the north of the Thames, the reason being that, inasmuch as our selling price was 3s., we should at once be able to pay, if we were allowed 3s. 9d., 12½ per cent. dividend. The Metropolitan Board of Works appeared upon their petition, and were represented by Mr. Cripps, who stated that the Board felt bound by what had taken place in 1875, and could not ask for a reduction in price from 3s. 9d. to 3s. 6d.; we were not to be punished for doing well for the consumer. At the same time, witnesses were called by the Metropolitan Board to detail before the Committee what would be the effects of amalgamation with the companies then existing on the south of the Thames, and upon the South Metropolitan Company. Subsequently two schemes were adopted and settled by the

Board of Trade, under the Act of 1876, and the portion coloured blue on the map represents the three Companies amalgamated, with the capital I have stated.

At the time the first amalgamation—that with the Surrey Consumers' Company—took place, the price charged by this Company was 3s. 9d. per 1000 cubic feet; but the result of the amalgamation was an immediate reduction to 3s. If the sliding scale had not been in operation, the amalgamations would not have taken effect; it was the inducement to get a larger dividend which led the Phœnix Company to amalgamate with us on Jan. 1, 1880. Their price was then 3s. 4d., and we had power to maintain it at this rate for twelve months; but at the end of six months we thought we saw our way to reduce the price, and so make it uniform over the whole district. We further considered the matter seriously last autumn, and, in view of these proceedings, we thought we would show the public that we were anxious to reduce the price to the utmost of our power, and we accordingly reduced it to 2s. 10d. over the whole of the district, the result being that nominally we earn 12 per cent. over the entire district. This is the lowest price charged in any portion of the Metropolis. By the operation of the sliding scale and the auction clauses the absolute price charged to the consumers in the way of dividend upon any capital to be raised under the powers of this Bill will be about 6 per cent., and therefore there will be a clear gain of 4 per cent. over the whole of the capital mentioned in the Bill—viz., £900,000. There was formerly a great benefit to gas shareholders in raising fresh capital. The South Metropolitan Company in 1869 obtained power to raise £250,000, which was then doubling their capital, and the whole of this amount was allotted to the shareholders, and is now worth £500,000 to them. The shareholders at the meetings were always urging the Directors to make calls, but under the operation of the auction clauses and the sliding scale there is every inducement to keep the capital down as much as possible.

Mr. MICHAEL: When the Metropolitan Board of Works say that the amount of capital you propose to raise is in excess of your requirements, will it be so or not? Can you have any inducement, as a company, to spend one single penny in advance of your absolute necessities?

Witness: We shall adopt every means in our power to avoid raising capital.

If you raise capital, and it is not commercially profitable, it must diminish the rate of dividend, must it not?—It simply dilutes the dividend on the existing capital, and we want to maintain that intact.

Therefore there is no community of interest between the existing shareholders and the new shareholders brought in under the operation of the auction clauses?—Not the slightest; we want to make the new shareholder pay as much as we can possibly get out of him.

You want not to dilute your dividend by the expenditure of capital which is not to be profitable?—Yes; it cuts in two ways—it prevents our raising capital unnecessarily, and it makes us very careful how we expend it.

In reply to further questions, witness explained how the necessity had arisen for requiring such a piece of land at Greenwich as was asked for under the powers of the Bill. The Phœnix Company, he said, had stations at Vauxhall, at Bankside, and at Greenwich, at which there was no room for extension. The original South Metropolitan Company had works in the Old Kent Road, and also room for extensions there to some extent; but, being situated on the canal, it was very inconvenient to get up large quantities of coal, which not only added at least 1s. per ton to the cost, but entailed great inconvenience besides; and if the Company were largely to extend the works there the increased cost of making gas would be very detrimental to the consumer. They, therefore, felt that these original works, as manufacturing stations, ought not to be extended any more, and they accordingly asked for power to take a large piece of land at Greenwich, which was almost entirely market-garden land, many feet below high-water mark. [Position pointed out on the map.] He did not think that any injury would accrue to property in the neighbourhood from the construction of these works. The piece of land would have to be given up to manufacturers of one kind or another, and gas-works were better than most of the works at present there.

Examination continued: If we construct the works there, we shall be able to get our coals much cheaper. The steam colliers will be able to come alongside a jetty which we propose to construct, and the coal will be transferred direct from the steamer to the retort-houses. At present the coal has to be lifted out of the steamer and put into barges and conveyed up the canal to the respective works, and then lifted again, entailing a largely increased cost; and, moreover, the coal is deteriorated. It is exposed to the weather and to the rain while in the barges, and a much longer time elapses before it is used. We have also to keep very large stores of coal to provide against the canal freezing, and the stock deteriorates considerably in the winter time. We do not intend to remove our present works, but to provide for our additional requirements on the new site, and I expect in ten years' time we shall be supplying twice as much gas as we are doing at present. I am rather apt to make low estimates, but the capital we ask for will, I should think, be expended in ten or twelve years. If we can make it last longer we shall be very glad to do so; but I am not at all sure about it. We have at present £220,000 of capital to sell by auction, and £190,000 to borrow under our own Act; £400,000, in round numbers, which will realize £600,000.

Mr. MICHAEL: You have adopted, in order as far as possible to meet the views of the Metropolitan Board of Works, a very large proportion of borrowing power as compared with capital—£600,000 to £900,000.

Witness: It is three-quarters—£675,000 of borrowing to £900,000 of shares.

I believe you cannot expend any capital without a certificate from the Board of Trade that the amount will be required within three years immediately ensuing after the time you have raised the money?—That is so. We are compelled, when we have raised £50,000 by sales by auction, to raise £37,500 by borrowing; and the effect of this combined operation will be that our capital will be raised at a rate not exceeding 5 per cent.

With reference to one important allegation in the petition of the Metropolitan Board of Works, supposing the standard price of gas were reduced, would it result in any benefit to the gas consumer, under the peculiar circumstances of your case?—It may sound like a paradox, but it would really be an injury to the gas consumer. Taking the present figure of 3s. 6d. as the standard price, and the present selling price of 2s. 10d., which gives 12 per cent. If we were going to place the new capital upon the market, we should state that we were entitled to divide 12 per cent. upon it, and this statement, provided the public had confidence in the maintenance of the initial price under the sliding scale, would, I feel quite satisfied, result in the £100 fetching £200 in the market, so that to raise our capital of £900,000 we should have to sell £450,000 worth of stock. The interest upon this £450,000 at 12 per cent., would amount to £54,000 a year as interest on £900,000 of capital.

That is practically 6 per cent. upon the nominal amount?—Yes, that is so; but supposing the contention of the Metropolitan Board were possible—which I cannot conceive—and that the initial price were to be reduced to 3s., the faith of the public in the sliding scale would be gone, and I do not know what premiums they would give. Calculating on the basis of the 6 per cent. on their money, it would require the sale of £514,285 to realize £900,000 of money, and this £514,285, at 10½ per cent., works out to exactly the same dividend, or the same interest, of £54,000 as the 12 per cent. did. So far it is equal. It is paying £54,000 in each case for the £900,000.

That is the absolute burden imposed upon the gas consumer?—Yes. If you have a lower initial price you get a smaller premium, and so, in effect, the consumer has to pay just the same, but I feel satisfied he would have to pay more. If the price were reduced 4d. per 1000 cubic feet—from 2s. 10d. to 2s. 6d.—it would entitle the shareholders to an additional 1 per cent., which on £450,000 is £4500; but 1 per cent. on £514,000 is £5140, so that if the price of gas should be reduced the raising of capital at the lower rate of dividend would entail a larger charge on the consumers.

There would be a larger amount to bear any reduction than there would be by the operation of the present price?—Yes. If, on the other hand, the price of gas should go up, then there would be a gain to the consumer. If it goes down there is a loss to him.

Has anything transpired since 1876 which in your opinion alters in any way the conditions under which your Act was obtained?—So far we are under almost the same conditions; there is very little difference in the price.

Is there anything by amalgamation which has altered the state of matters, so that if the Metropolitan Board had appeared they might in any way have alleged any change which ought to re-act upon the standard price?—I think it is the other way. In 1876, if the Phœnix and Surrey Consumers' Companies had gone to Parliament independently, they would undoubtedly have been allowed the 3s. 9d. standard price, they not being in so good a position as regards capital as the South Metropolitan Company. They were, moreover, certainly in as favourable a position as the Chartered Gas Company

And the Metropolitan Board were willing that the 3s. 9d. should apply to them individually?—Yes.

Therefore the price of 3s. 9d. has been reduced by amalgamation to 3s. 6d. over the whole of the district?—Yes, that is so.

Examination continued: As far as Messrs. Hyam's land is concerned, it is really like the rest of it, but in the extreme left-hand corner there is a dry dock, the property of Mr. Lewis, occupying some 2 or 3 acres, and Mr. Lewis puts it, I believe, that we may damage his property, so that we must settle it one way or the other. We offered to limit our compulsory powers of purchase to twelve months. Mr. Lewis would not be surrounded by gas-works, because he would be outside of us if we did not take his dock.

Cross-examined by Mr. BIDDER: In increasing our works in the future we are going to spend our money at Greenwich, instead of spending it at our different works in town. With regard to the normal annual capital expenditure in the districts of the companies which now form the amalgamated Company, if the figures are taken from their returns something like £80,000 a year will be arrived at; but I have a qualification to urge in regard to that. The Phœnix and the Surrey Consumers' Companies were rather short of capital, and as a consequence they did not, for the extension of their works, call up quite the full proportion; in fact, the Surrey Consumers' Company hardly increased their capital during seven or eight years previous to the amalgamation. Their business increased 50 or 60 per cent., while their capital did not increase at all, because they paid for all extensions out of revenue. I am afraid that our normal requirements in the future will be very much more—most likely double. To give an illustration, I may state that the South Metropolitan Gas Company in 1869 had £250,000 of capital, and they obtained power to raise another £250,000. In the ten years during which this £250,000 was raised, the business was practically doubled, and the capital was doubled also. Our business goes on increasing annually, and in the future will probably be somewhat comparable to what it has been in the past.

Mr. BIDDER: Then, generally, am I wrong in assuming, subject to your observation, that the other companies have not spent quite so much as they ought to have done? That is, if between £70,000 and £80,000 a year was the capital requirement in the past, something like this will probably be the requirement in the future?

Witness: Certainly not. It will be very much more. Taking the instance of the Surrey Consumers' Company, there was no calling up of capital at all for seven or eight years. I have the figures here for the years 1879 and 1880. The capital of the three companies in 1879 was £2,034,688, and in 1880 it was £1,951,490.

That is going downward, and shows a reduction of £80,000?—I can explain this. The Phœnix Company had £360,000 of 7½ per cent. capital, and £144,000 of 5 per cent. capital. The Board of Trade said: "We want the capital all to be uniform," and therefore the £144,000 of 5 per cent. was reduced to £72,000 of 10 per cent., which took off £72,000; and the £360,000 of 7½ per cent. was reduced to £270,000 of 10 per cent., which together amounts to a reduction of £162,000. Adding £162,000 to the £1,951,490, shows an actual increase of £80,000.

That is last year. Why am I very wrong, therefore, if I suggest that this year, and next year, and the year after, you probably will want only £80,000 or £90,000?—Because last year there was no extension to speak of on capital account at any of the works except the South Metropolitan. It will probably be more this year, because if we obtain our Act we shall have to pay a large sum for the land, and it is quite problematical what the cost will be.

You are asking their lordships to authorize the raising of £1,600,000 of new capital, and have already power to raise £600,000; if the Committee pass clause 4 of your Bill, you will thus have power to raise an additional £2,200,000?—That is just about doubling our capital, which it has, I believe, been the general practice of Parliament to allow to gas companies.

You justify this by laying it down as a rule to be followed, that whenever a company apply to Parliament it is reasonable they should ask to double their capital?—To carry them on for about ten years, and so avoid such an expensive contest as this.

If the past is any guide to the future, £2,200,000 of capital would carry you on for more like 25 years than 10, at the rate you have been spending money, will it not?—It certainly will not, nor anything like it.

With regard to the initial price, do I understand you to put it before their lordships that this is a matter which should be regarded as a bargain, and which it is a breach of faith to interfere with?—Certainly, and impolitic also.

First dishonest, and then not expedient?—Yes; suicidal, so far as the consumers are concerned.

In the figures you mentioned to the Committee towards the end of your examination, was there not one trifling omission in your reasoning left out of account altogether in considering the interests of the consumer—viz., that you save 2 per cent. upon the whole of the existing capital of £2,000,000?—No.

Does it not occur to you that if your dividend is limited to 10 instead of 12 per cent., 2 per cent. on the existing £2,000,000 of capital amounts to a good deal of money, and that there is a saving to the consumer of £40,000 a year?—How is the consumer to get it?

Do you mean to say that you have some plan of preventing him getting it?—I say distinctly that if, after we have worked up to 12 per cent., the

initial price were cut down and our extra 2 per cent. were taken from us, all future inducement to reduce the price would be gone. We are now exerting ourselves to save every penny, and I can assure you that it is a difficult matter to save £10,000, but it is easy to waste £50,000.

The provisions of the General Act of 1847 contain an absolute limitation to 10 per cent. maximum dividend; and therefore I am entitled to say that the whole of the capital of this Company was subscribed by the public upon the understanding that they were never to receive more than a maximum dividend of 10 per cent.?—Yes; but the sanction of the shareholders was obtained to the amalgamation, on the faith and strength of the sliding scale.

Therefore it is no breach of faith to those who have found the money if they were actually limited to 10 per cent.?—Yes, it is; because under the old system they were absolutely guaranteed their 10 per cent., while under the new system they say: "We are willing to run the risk of getting less than 10 per cent. if the price of coals goes up."

Was not the legislation of 1868, before Mr. Cardwell's Committee, with the express idea that the companies would be obliged to come before Parliament from time to time, and have their affairs regulated as circumstances required?—Yes; but that did not apply to the Phœnix and Surrey Consumers' Companies. The Act of 1868 applied to the north of London only. You have, however, left out one thing Mr. Cardwell said—viz., that the companies were entitled to their maximum dividends of 10 per cent. provided that they exercised due care and management. The Act of 1868 provided for the maintenance of the 10 per cent. dividend under all circumstances.

In 1875 Mr. Forster endeavoured to fix what he considered was a fair standard price for the whole of London—3s. 9d.?—It was the proposal of the Metropolitan Board themselves. The companies, however, strongly objected, and would not accept it, and it did not take the form of an Act except in the case of the Commercial Gas Company.

In 1876 your Company were before Parliament?—Yes.

And the matter was discussed before the Committee as to what was a fair figure to put as a standard price in your case. Did not this discussion proceed upon an endeavour to ascertain whether the initial price would, to use your own words, secure you 10 per cent. under ordinary circumstances with due care and management?—Certainly not, because we were charging 3s. at the time, and 3s. 9d. would have secured us 12½ per cent., and 3s. 6d., which was fixed, actually did secure us 11½ per cent.

Did you not say: "With the present price of coals, and so on, we can divide 10 per cent., but you must not assume that this will always be the case;" and so ultimately you induced the Committee to fix 3s. 6d. as the initial price?—The Committee fixed 3s. 6d., I believe, because our maximum was 3s. 6d. at the time.

The result has been that instead of dividing 10 per cent., as you did some years ago, you have been dividing 12 per cent.?—Yes, and I believe that, in the published reports of the proceedings, the Metropolitan Board said they did not wish to attack the South Metropolitan Company.

What has happened principally has been that by amalgamation with other companies much larger than yourselves you have introduced very great economies, such as a reduction of staff, and so on, have you not?—The economies have not had time to work yet, as they only commenced this year.

Since 1876 you have amalgamated with two other companies, and I think I am not wrong in saying that those two companies are three times as big as the South Metropolitan?—If you take the capital, you are quite right; but if you take the coals used and the extent of business, you are wrong.

It is quite true that in 1876 there was a clause in the Act authorizing you to enter into amalgamation, generally, with certain companies; but the enactment of the 3s. 6d. initial price simply referred to the South Metropolitan Company?—At the time, but with the view of amalgamation, undoubtedly.

The other two companies that formed the greater part of the undertaking were under the older Act; and had never been under the sliding scale?—They were allowed to supply 12-candle gas, and to charge 4s. 6d. per 1000 cubic feet, and they surrendered these rights to come under the sliding scale.

When the matter of amalgamation was before the Committee of 1876, and discussed in connection with the question of price, you stated, in reply to Mr. Michael, that, if there were to be any amalgamations with any other companies, the schemes would have to go before the Board of Trade, who would deal with all these questions of price?—The Board of Trade had no power to deal with the price, because that was fixed in the Act.

Your evidence then was that the clauses in your Bill were such as would refer the whole matter to the Board of Trade; and the "whole matter" included the price as well as other things?—I must say one word about this. Mr. Michael was not then acting on behalf of the Metropolitan Board, but on behalf of two parishes, and particularly the parish of Camberwell, who objected to our amalgamation with any company. The parish said: "We have obtained such great advantages by being supplied almost exclusively by the South Metropolitan Company, that to connect us with any other company will act to our detriment;" and then it was said: "You, the South Metropolitan Company, are charging 3s., and the Phœnix, 3s. 4d. or 3s. 6d., and if you can you will strike an average and put up the price in our own district of Camberwell considerably beyond what it is." Now take the actual facts. In the first place, there was this safeguard against raising the price—that we were under the sliding scale, and if we raised the price we should reduce our dividend, and we were not at all inclined to enter into any arrangements for amalgamation whereby we should suffer a direct loss; neither would our shareholders ever agree to it. The amalgamations, however, took effect, and the price in the Surrey Consumers' district was reduced from 3s. 9d. to 3s., and in the Phœnix district from 3s. 4d. to 3s. The only detriment our consumers suffered in the matter was that probably the price would have been reduced to 2s. 10d. a year earlier than it has been, but we should never have thought of raising the price at the time.

Now I come back to my question, which is—that in 1876, it being suggested that questions of price, and the effect of amalgamation on price, would arise, your evidence before the Committee was that the clauses of the Bill provided that the whole matter should be dealt with by the Board of Trade.

Mr. Michael: And it really was.

Witness: What I meant was that any scheme of amalgamation that might be submitted to the Board of Trade would not be considered so far as it was beneficial to the company, but so far as it was beneficial to the public. The whole matter, in that sense, would be referred to the Board of Trade, and they would not assent to any amalgamation unless it benefited the public.

Mr. Bidder: Do you say that you did not mean that the question of price would be referred to the Board of Trade?

Witness: It is impossible I should have suggested that the initial price should be referred to the Board of Trade, because I was the author of the sliding scale, and certainly knew what I thought about it.

Now I go on a step farther. When you amalgamated with these companies you went before the Board of Trade with a scheme, and the Board were invited to consider the question of the effect of amalgamation on the initial price, and they decided that it was not within their province at all, did they not?—Yes, they were invited to do so by the Metropolitan Board or the parishes (I forget which), but they certainly did not consider the initial price.

The Act of 1876 fixed the initial price and sliding scale for your original Company, but under what power or legislation have you applied it to the district of the other two companies?—Under the authority of the amalgamation clauses in the Act of 1868.

Mr. Michael said it was the 20th section of the Act of 1868—"If the companies assent to the modifications (if any) suggested by the Board of Trade, and the scheme, whether modified or not, is confirmed by Order of Her Majesty in Council, the same shall have full effect, and shall be as binding as if it had been enacted by Parliament."

Mr. Bidder: That simply says the scheme shall be binding, and you have already said it was not part of the Board of Trade's scheme to settle the question of price. My question is, not under what authority you have amalgamated with the other two companies, but under what authority you have applied this 3s. 6d. initial price to their districts?

Witness: I must transfer the responsibility of that to the Board of Trade, who could have refused their assent to the amalgamation. As, however, the Board passed the scheme, they must have thought it was in the interest of the consumers, or they would not have done so. I cannot give any other answer than that the scheme of amalgamation settles the application of the initial price.

Am I to put it that, so far as you know, you cannot point to any authority which entitles you to represent the sliding scale as applying to the major portion of the united Company?—I can point to an authority which is equivalent to an Act of Parliament—namely, the clause in the Scheme of Amalgamation. Our Act of 1876 fixed the price, and clause 14 of the scheme says it is to apply.

Your Act of 1876 gives you a right to amalgamate on certain terms, one of which is that the sections of the City of London Gas Act, 1868, shall be incorporated and apply to amalgamations; and the 23rd section of the City of London Gas Act, 1868, states that "after any such amalgamation an amalgamated company shall be deemed to be a company within the meaning of the Act of 1860 and of this Act?"—I have never understood that any of those clauses were incorporated in our Act of 1876, except those defining the process of amalgamation.

Unfortunately your Act of 1876 says expressly that they are all included?—No; it says the amalgamating clauses only.

Your own Act says that the clauses in the Act of 1868 are to be taken as incorporated. I want to know what authority you have for applying the sliding scale to the other two companies?—It is done, at any rate.

You have no other answer to give me?—That is sufficient; I think the Act of 1860 is upset, and the Act of 1868 too.

As a matter of fact, you say that amalgamation does introduce considerable economy in the cost of manufacture?—Yes, I hope so; although it has not yet produced anything to speak of.

But you have paid enormous sums by way of compensation to directors and officials, have you not?—Not only that, but the original South Metropolitan Company is worse off now than if it had not been amalgamated. In that case we should now have been paying a larger dividend, but by amalgamating with other companies not in so good a position as ourselves it has retarded the reduction of price to a slight extent.

If I were to do such a dreadful thing as to suggest to their lordships that your initial price should be 3s., what would be the effect at the present time—how much would you divide?—10½ per cent. I should, in such a case, never be able to show my face at any of the meetings of the gas companies again. In 1875 I was a witness for the Metropolitan Board, and contended for this sliding scale, for which at the time I was called a traitor, and the gas people would not look at nor speak to me. They said: "What a fool you are to suppose that this Metropolitan Board can ever be trusted. No sooner will you get the dividend up to 12 per cent. than they will come and try to get it knocked down to 10 per cent.;" to which I replied that I thought it was a settlement of the question.

In cross-examination by Mr. Saunders, witness stated that Mr. Lewis had told him that nearly 3 acres of the land proposed to be acquired were held by him, a portion of which was used as a dry dock. He (witness) did not know that Mr. Lewis had large contracts with companies and owners of steam vessels ranging over a long period. He had seen a large ship in the dock some time since. He had not noticed delicate work, such as decorating or upholstering, going on; but even presuming such work was being done, he did not consider any injury would arise unless the smoke and dust from gas-works went very close to it, which would not be the case. The works belonging to the Biphosphate Guano Company had been acquired by the Gas Company, but could only be used as a wharf. Mr. Lewis had been asked to name a price for his property, but he had not done so; neither had the Company made any proposal to him. The greater portion of the ground was unoccupied, but if the Company were to be compelled to buy land covered with buildings, and which had on it such an expensive piece of plant as a dry dock, it would add very materially to the cost. They would acquire the site if they possibly could, but they wanted to avoid paying an exorbitant price for it. A road had been recently completed, and several building schemes set on foot directly it was known that the Gas Company were going to acquire the land, but no actual steps had been taken in this direction down to a month or so ago. The object of one of the proposed clauses was to remove the purifying process as far as possible from the houses, and was inserted to meet the objection of the Greenwich people. It was possible that the works might be constructed without touching Mr. Lewis's property, but then the other side of the case must be looked at; other works might have been placed there just as bad. The Gas Company had undertaken to form a 40-feet road up to the river, and hand it over to the Greenwich Board of Works within two years after the passing of the present Act; in consequence of which the Board withdrew their opposition. The Company were quite willing to agree to a limitation of twelve months for the exercise of their compulsory powers, instead of three years as proposed in the Bill.

Re-examined by Mr. Michael: I do not know exactly what work Mr. Lewis does, but it is possible some of his painting may be damaged by proximity to gas-works, through some sulphur or smoke, or dust given off into the air. We have no wish to do any injury to Mr. Lewis, but would be very glad to do everything we could for his accommodation.

Mr. Michael: One or two questions have been put to you by Mr. Bidder. For the first time the Act of 1868 gave power to amalgamate certain companies on the north of London; and your Act of 1876 gave you similar powers with reference to companies on the south?

Witness: Yes; by simply incorporating the clauses of the Act of 1868.

The Act of 1860 is practically abrogated by the Act of 1868, and then by the Act of 1876?—Yes. The Act of 1860 was abrogated by the Act of 1868, at the instance of the Corporation and the Metropolitan Board; and the Act of 1868 was abrogated by the Act of 1876, at the instance of the same parties.

The special clauses put into the Act of 1876 practically abrogated the Gas-Works Clauses Act, 1847, which contained the governing provision for

the whole of the gas companies of the Metropolis antecedent to that period?—Yes; the Act of 1847 did very much for questions of competition, which were universal at that time.

When you applied to the Board of Trade, one of the provisions was that wherever your Act was inconsistent with any of the other Actf, your Act was to prevail?—Yes.

And it is inconsistent so far as the auction clauses and sliding scale are concerned, also so far as it adopts a standard price instead of a maximum price?—Yes.

Mr. LEDGARD: I understand that the question of price was never included in any representations which were made by the Metropolitan Board of Works.

Mr. MICHAEL: So the witness has said several times. (To witness): Did anything whatever eventuate in the amalgamation which would tend to reduce the initial price of 3s. 6d., as granted in the first place to the South Metropolitan Gas Company?

Witness: No.

By a LORD: With regard to the purchase of the land, do I understand that under the Bill as it now stands the Company have power to purchase the whole of the land which has been referred to, or to reject any part of it they please?

Witness: Yes.

Whether they want all of it or not is a question which will have to be considered afterwards?—Yes.

Mr. MICHAEL said he felt that the witness had gone so very fully over the whole ground that he did not propose to call any further evidence. At the same time he should be glad if their lordships would kindly intimate if they wished Mr. Farrer to appear before them.

The Counsel and parties were then directed to withdraw.

On being again called in,

The CHAIRMAN said the Committee were quite ready to hear them if Mr. Michael would call them as his witnesses.

Mr. MICHAEL: We are unable to do that, my lord.

The CHAIRMAN: Then we do not propose to call them.

The case for the promoters was then closed.

(*To be continued.*)

Legal Intelligence.

HIGH COURT OF JUSTICE—QUEEN'S BENCH DIVISION.

MONDAY, JULY 4.

(*Before Justice* FIELD *and a Special Jury.*)

SANKEY *v.* THE GASLIGHT AND COKE COMPANY.

This action was brought to enforce performance by the Company of an agreement alleged to have been entered into by them on taking land from the plaintiff under their statutory powers, and for this purpose to have the deed of conveyance rectified. Mr. Sankey, the plaintiff, is a Magistrate of Gravesend, and on the opposite bank of the Thames carried on an extensive business as a lime, cement, and building materials merchant. In 1867 part of plaintiff's property on Bow Creek was taken under a notice to treat by the Company, and for the value of the land taken and for the damage done to him by the severance of his property from the Barking Road access, in the rear (which was very important for the purposes of his business), he claimed £1200 compensation. An arbitration followed, as the Company disputed the claim, and at the first meeting, while the first witness, a Mr. Ellis, was being cross-examined, an arrangement was made for payment by the Company of £500 for the land, and the construction by them of a road 20 feet wide, which would give access to the plaintiff's works. Mr. Sankey now alleged (though the deed contained no such provision) that a further element in the arrangement between the parties at the time was that the land taken by the Company should never be let by them, or used by themselves for any purpose which would be in competition with the business carried on by the plaintiff. This the Company denied, as well as the plaintiff's contention that he had never intended to deprive himself, as the deed expressed, of his right to pre-emption of the surplus land not required by the Company for their own purposes. These disputed questions had now to be tried in the action.

Mr. R. E. WEBSTER, Q.C., and Mr. ANDERSON appeared for the plaintiff; the ATTORNEY-GENERAL (Sir Henry James, Q.C.), Mr. A. L. SMITH, and Mr. PAINE for the defendants.

Mr. WEBSTER said that whatever might be the plaintiff's legal rights and remedies, he had no doubt suffered a very considerable wrong. Breach of an undertaking was charged against the Company, and rectification of the deed of conveyance was asked in two respects in which it failed to carry out the plaintiff's intention. He alleged that in connection with the purchase of his land by the Company they entered into a distinct parole undertaking not to allow the land to be used at any time for purposes of rivalling the plaintiff in his trade; and he also impeached the accuracy of the deed in another respect, denying that he had bargained away his right to re-purchase the land should it not be required for the purposes of the Company. As was well known when a corporation or public body acquired land under an Act of Parliament, if they ceased to use any portion of it for their purposes it became superfluous land, and either the original vendors or (in default of them) the adjoining owners had the right to buy it back again. This land was now being used for other than the purposes of the Company, but to his astonishment the plaintiff found he was supposed to have bargained away his right to recover it. He first established his business in 1858 on the Middlesex side of Bow Creek, and abutting on the Thames, where the water frontage necessary for such a business was obtained, to accommodate the carriage by river and canal of bricks, cement, and other heavy building materials. At the rear, his premises had direct access from the Barking Road. Afterwards in 1864 he acquired, on the opposite side of the creek, where the defendants were, a piece of land from a Mr. Williams, a lessee of Sir Robert Fitzwigram, for 99 years from 1863, taking over the conditions of the lease, among which was the erection of buildings to the value of £15,000. In making the agreement with Mr. Williams, plaintiff stipulated, for the protection of his trade, that none of the land remaining in Mr. Williams's possession should be let for any purpose that would compete with his (plaintiff's) trade. In 1867 the Company, under their Act of Parliament, took plaintiff's premises on the Middlesex side of the creek, and for it they paid him about £3800 compensation. Another notice to treat for part of his Essex side premises (about a quarter of an acre) was served in the following year, and for this he claimed £1200; £600 of which was for damage in respect of interference with the Barking Road access. At an ensuing arbitration the late Mr. Horace Lloyd, Q.C., and Mr. Grantham appeared for the plaintiff; Mr. (now Justice) Hawkins, Q.C., and Mr. Bidder, Q.C., for the Company. Soon after the proceedings commenced a meeting took place between Mr. Rumeo (now dead), the Company's surveyor; Mr. Hooker, their solicitor; Mr. Haines, plaintiff's surveyor; and his solicitor's clerk. The result of a conversation between them, the plaintiff also being present, was that the Company agreed to pay £500 for the land, and to give the plaintiff a 20-feet wide road to his back land. This portion of the arrangement was endorsed by the Counsel on their briefs as the terms of compromise; but the plaintiff said he also asked Mr. Hooker, the Company's solicitor, "whether the Company would undertake that the land should never be used for the purposes of a cement, brick maker's, or building material merchant's business;" whereupon he was at once assured that the land would never be so used, Mr. Hooker adding: "We are a gas manufacturing company, and as we shall want it ourselves, it cannot be used for any other purpose." Then the deed of conveyance was prepared, and was signed without perusal by the plaintiff. While omitting the stipulation against a rival trade being carried on, it contained a term which it was not pretended was ever brought before Mr. Sankey's attention, renouncing his right to get back the land if the Company did not require it. There the matter rested for several years, no attempt being made by the Company to use the land in any way detrimental to plaintiff's interests; but in 1873 part of the premises which he had sold to the Company was let by them to a Mr. John Byford, who, commencing in the first instance as an agent of theirs for the sale of coal and coke, afterwards began to compete with the plaintiff in the sale of building materials of every kind, with an advantage over him of position, from being between him and the road. Mr. Sankey, contemplating proceedings, went to his solicitor, but curiously enough every scrap of paper in reference to the matter had been destroyed, and a long correspondence ensued with the Company, who were accused of breaking their agreement. Counsel's briefs on the arbitration, it appeared, had simply recorded that a verdict had been taken for £500 on terms signed, those terms having, in fact, been arranged verbally between the solicitors and surveyors.

Mr. *Sankey*, the plaintiff, was then called, and deposed to having been present at the arbitration when the arrangement was made verbally between the solicitors and surveyors, which was thereupon communicated to the Counsel engaged in the case. He positively said he only accepted the terms offered by the Company on their undertaking being given, as required by him, for the protection of his business. Mr. Rumeo and Mr. Hooper said: "We agree not to let the land to any one who will use it to set up in opposition to you, and the Company will not use it for such a purpose themselves." He took it for granted that the deed he signed properly expressed the arrangement made, and therefore signed it without perusing it. Nothing whatever was said at the time as to his giving up his vendor's right to get back any surplus land, and was not aware that the deed contained a clause to this effect until after the action was commenced.

In cross-examination several letters, among the correspondence, were placed in his hands, and upon being asked how it was that in them no reference was made to the matters now alleged by him, he stated that he was unwilling then to complicate the matter unnecessarily, and to imperil prospective arrangements by referring to them, and thus inviting litigation.

TUESDAY, JULY 5.

Upon the case being resumed this day, it was announced that the parties had come to an arrangement, and a juror was withdrawn.

Miscellaneous News.

METROPOLIS GAS SUPPLY.

The Chief Gas Examiner for the Metropolis (Dr. Williamson, F.R.S.) has just presented his report on the quality of the gas supplied by The Gaslight and Coke, Commercial, and South Metropolitan Gas Companies, during the quarter ending June 30, 1881:—

I. *With respect to Illuminating Power.*—The average illuminating power in standard sperm candles at each of the testing stations of the three Companies was as follows:—

	Average.
The Gaslight and Coke Company—	
Jewry Street, Aldgate (common gas)	16·7 candles.
King Street, Cloth Fair "	16·6 "
Dorset Buildings, Salisbury Square (common gas)	16·9 "
Millbank Street, S.W. (cannel gas)	21·3 "
Ladbroke Grove (common gas)	17·2 "
Bruce Terrace, Devon's Road (common gas)	17·0 "
Carlyle Square, Chelsea "	16·7 "
Camden Street, N.W. "	17·0 "
Graham Road, Dalston "	17·0 "
Kingsland Road, E. "	17·0 "
Commercial Gas Company—	
Wellclose Square (common gas)	17·1 "
Parnell Road "	17·0 "
South Metropolitan Gas Company—	
Hill Street, Peckham (common gas)	16·5 "

It will be seen from these results that at all the testing stations of The Gaslight and Coke Company the average for the quarter has been considerably above the requirements of the Acts of Parliament, more especially at the Millbank Street and Ladbroke Grove testing-places. The gas made by the Commercial Gas Company did not fall below the parliamentary standard during the quarter, even when lowest, and has averaged, both at the Wellclose Square and the Parnell Road stations, 1 candle above the standard. The gas made by the South Metropolitan Gas Company, and supplied to the Hill Street station, has also averaged well during the quarter.

II. *As regards Purity.*—Sulphuretted hydrogen has not been present in the gas at any of the testing stations. The average amount of sulphur in other forms than this was as follows:—

	Average.
The Gaslight and Coke Company—	
Jewry Street, Aldgate	9·3 grains.
King Street, Cloth Fair	9·6 "
Dorset Buildings	9·2 "
Millbank Street	8·1 "
Ladbroke Grove	9·2 "
Bruce Terrace, Devon's Road	11·2 "
Carlyle Square, Chelsea	12·5 "
Camden Street, N.W.	11·9 "
Graham Road, Dalston	11·4 "
Kingsland Road	12·4 "
Commercial Gas Company—	
Wellclose Square	7·1 "
Parnell Road	9·8 "
South Metropolitan Gas Company—	
Hill Street, Peckham	10·7 "

It appears from these results that with regard to sulphur, the average for the quarter has been in all cases considerably better than required by the Acts, more especially at the Millbank Street and Ladbroke Grove stations of The Gaslight and Coke Company, and the two stations of the Commercial Gas Company. At the Hill Street station the average has been less than half of the amount allowed.

Ammonia has been present in the gas during the quarter at all of the stations (with the exception of the City of London testing station at Jewry Street), but only to a slight extent. On no occasion was the amount excessive.

The testing station at Graham Road, Dalston, was closed for repairs for several days during the month of May.

THE MEDALS AWARDED AT THE MELBOURNE EXHIBITION.

In the JOURNAL of May 3 and 10, a list of the awards in the various "Orders of Merit" was given; and we are now enabled to publish the Jurors' awards of medals—gold, silver, or bronze—in respect of the exhibits of gas and water apparatus from Great Britain. They are as follows:—

Jury XII.

Anchor Tube Company, Birmingham: Gas and Water Tubes, silver.
Cowan, W. and B., Edinburgh: Wet Gas-Meters, silver.
Cowen and Co., J., Blaydon-on-Tyne: Fire-Clay Goods, bronze.
Dunnachie, J., Glasgow: Fire-Clay Goods, bronze.
Defries and Sons, J., London: Crystal Chandeliers, gold.
Ford and Co., J., Edinburgh: Crystal Chandeliers, gold.
Glover and Co., G., London: Gas-Testing Apparatus and Dry Meters, gold.
Harper and Moores, Stourbridge: Fire-Clay Goods, bronze.
Hunt and Co., J., Birmingham: Gaseliers, &c., gold.
Lloyd and Lloyd, Birmingham: Gas and Water Tubes, silver.
Peyton and Peyton, Birmingham: Gas and Water Tubes, silver.
Russell and Sons, Limited, James, Wednesbury: Gas and Water Tubes, silver.
Spencer, John, West Bromwich: Gas and Water Tubes, silver.
Sugg, W., London: Photometers (one award), and Lamps for Street Lighting (second award), two silver.
Walker, C. and W., London: Gas, Centre, and other Valves for Purifiers, &c., silver.
Webb and Sons, T., Stourbridge: Crystal Chandeliers, gold.

Jury XXVI.

Armstrong and Co., Sir W., Newcastle-on-Tyne: Hydraulic Plant, Pumping-Engines, Accumulator Crane, &c., gold.
Crossley Bros., Manchester: Gas-Engines, gold.
Meynall and Inman, Wolverhampton: Steam and Water Fittings, Pumps, &c., silver.
Russell and Co., Limited, John, Wednesbury: Wrought-Iron Tubes and Fittings, &c., four silver.
Tangye Bros., Birmingham: Miscellaneous Apparatus (six awards), three gold and three silver.

Jury XXVIII.

Brown and Co., Limited, J., Sheffield: Manufactured Iron and Steel, gold.
Baldwin, E. P. and W., Stourport: Sheet Iron and Tinned Plates, gold.
Rustless and General Iron Company (J. E. and S. Spencer), London: Anti-Corrodo Tubes and Fittings, gold.
Shirlaw and Co., A. B., Birmingham: Engineering and Gas Fitting Tools, silver.

SOME NOTES FROM AMERICA.

(FROM OUR OWN CORRESPONDENT.)

June 20, 1881.

It is not too much to say that at no time during the last three years has electricity and its possible application received so much notice in the daily press as at the present time. What with the advocates of the different systems whereby it is proposed to use this power in lieu of gas, each trying to bring and to keep his own lamp prominently before the public; the glowing accounts of the Faure battery, and the improvements thereon by Dr. Higgs; and the vivid description of the Siemens electric railway in Germany—we are indeed treated to an abundance of information respecting this great power. If the plan proposed by the Brush Company of New York for lighting the two parks, or squares, on Broadway, which is a part of the district included in the contract recently entered into between the Authorities and that Company, is carried out, the denizens of the Metropolis of America will have an opportunity of viewing a dazzling spectacle, for it is proposed to set in each park one post which is to carry electric lights of which the aggregate power is to equal 36,000 candles. The plan is to have the post 165 feet high, to be embedded in the ground 15 feet, leaving the top of the post 150 feet from the ground. The post is to be made of boiler iron, with a diameter of 4 feet. Part of the way up it is proposed to have a balcony which will be used in replenishing the carbons; there will be suitable appliances for lowering the lamps to this point, and raising them again to their proper position. The post will be supported by guy-ropes stretching from it to four guy-posts set in the ground at a radius of 75 feet from the base of the tower. It is proposed that lights of 24,000-candle power be placed at the top, while lights aggregating one-half of this will be placed at a point 100 feet high, making a total of 36,000 candles. It is expected that these lights will not only illuminate the parks, but also the adjacent streets for two or three blocks in each of the four directions.

As in London a short time since, so in New York, the electric lights will go out occasionally. Those on Broadway were recently extinguished during a storm, and it was several hours before they were brought into working order again. According to the New York papers, the Secretary of the United States Electric Light Company (which controls the Maxim patents), at the annual meeting of the stockholders, held on the 7th inst., admitted the correctness of the statement recently made by Mr. Leo Daft, of the New York Electric Light Association, that the cost of producing the electric light by the incandescent system is greater than that of gas light, in the proportion of 1500 to 992. The Secretary further remarked that the only practical system of electric lighting was on the incandescent plan, and although at present this was more expensive than gas light, yet ultimately their apparatus would be so improved and modified as to reverse these conditions.

It is reported, on what seems good authority, that a competitive trial of the Higgs and Edison lamps will soon be made in New York. It will be remembered that Dr. Higgs makes use of the infinitesimal arc, or, in other words, maintains the two carbon-points at so small a distance apart that the unaided eye can scarcely discern that they are not in contact. If the trial really comes to pass, it will be regarded with much interest by the select few who will have access to the scene of the test; but as it will be conducted as a private affair, it will doubtless be difficult to obtain the result of it.

The electric light has recently been made use of in photographing the groups, costumes, and scenery of the Greek play of Sophocles, the "Œdipus Tyrannus," recently brought out at Cambridge, Mass. The natural light of the theatre was not sufficient for the work, so an electric lamp of 6000-candle power (nominal) was employed in conjunction with the sunlight. The effect is said to have been very good.

A company has recently been incorporated under the laws of Pennsylvania for the ostensible purpose of conveying gas from the gas-wells in that State, to New York, Brooklyn, and adjacent cities; but it does not yet transpire how they propose to accomplish their object.

Baltimore is to be blessed with another gas company. The city is at present supplied by the Consolidated Company, formed by the amalgamation of three companies. The new Company proposes to manufacture coal gas. Captain W. H. White, the Secretary of the American Gaslight Association, will be the Company's Engineer. Opposition works are also being started at San Francisco, Cal. This Company will manufacture water gas under the Hanlon and Johnson patents. The chief peculiarity of their system is that they use crude petroleum for enriching, instead of naphtha, which is employed by most of the water gas companies.

The second annual meeting of the Central New York Gas Engineers' Association was held at Auburn on the 18th of last month—the President, Mr. A. C. Wood, of Syracuse, in the chair. The President delivered a short address, in which he referred to the growth of the Association, and to the Association's visit, on the occasion of their last semi-annual meeting, to Bradford, Penn., where they found the Bradford Natural Gas Company doing a thriving business. This Company had at that time just sunk some wells nine miles from Bradford, for the purpose of getting an additional supply of gas, and were at the time of the Association's visit engaged in laying a line of pipe therefrom to the city, taking a straight course for the same, regardless of obstructions, deviating only for oil-wells. Mr. Wood was re-elected to the presidency, as was also Mr. Clement White to the secretaryship.

The Western Association's annual meeting was held at St. Louis on the 11th ult. Mr. Butterworth, the President, occupied the chair, and gave a most interesting address to the members.* Mr. Price, President of the American Association, was at the meeting, and made some remarks, in the course of which he said there was no doubt but that the electric light would reduce gas consumption a little, but he hoped they would make good this loss in other directions. A great deal of time at the meeting was consumed in reading accounts published in some of the daily journals regarding the electric light. In the course of some remarks, Mr. Smith, of Grand Rapids, mentioned that he presumed there were more electric lights in use in his city than in any other in the West; notwithstanding that, by reducing the price of gas to 2 dols. (8s.), his Company had nearly doubled its consumption. Mr. Butterworth and Mr. Lee A. Hall were re-elected to the offices of President and Secretary respectively. Mr. Munzinger, of Philadelphia, made some remarks on the loss of gas, explaining the apparent loss caused by the gas being registered under a lower temperature at the consumer's meter than at the gas-works. The effect of pressure in this connection was also dwelt upon. Mr. Munzinger placed the life of service-pipes at from ten to twelve years. Mr. Gimper then read a translation from the German of the "Report of the Commission upon Generators, to the German Gaslight Association," by Messrs. E. Grohn, S. Schiele, and Dr. Schilling. Under the head of "Treatment of Gas after leaving the Retort," exhausters received considerable notice. Mr. Smith mentioned that before putting on an exhauster his yield was 8000 feet per ton, but since its introduction, with the same kind of coal, he gets 9260 feet. Mr. Howard gave an account of his experience with a jet exhauster. After having one of these machines in operation about two weeks, he had a stoppage caused by naphthaline. Ever since then he had had to clear out his pipes every eight days. In fact, he had given his attention to devising some expeditious method of freeing his pipes of the substance, instead of preventing its formation. In his case the naphthaline always makes its appearance at one particular place—namely, the outlet of the washer; so, as remarked by some of the members at the meeting, the cause of its formation is probably due to some defect in the general plan of condensation rather than to the jet exhauster. The order in which his apparatus is placed seems to be as follows:—Hydraulic main, exhauster, washer, condenser, scrubber, dry scrubber, then the purifiers. Other gentlemen gave their experience with the jet exhauster. None of them had been troubled with naphthaline. A Committee of three members, consisting of Messrs. Lansden, Watts, and Howard, were appointed for the purpose of corresponding with the different gas companies throughout the country, and endeavouring to procure subscriptions to enable them to offer a prize for the invention of the best gas-engine. The Association inspected several manufactories, and after partaking of a bountiful lunch provided by the St. Louis and Laclede Gas Companies, adjourned to meet next May in Chicago.

The New York State Legislature has recently passed a law which requires all plumbers and journeymen, doing business in New York City or Brooklyn, to have their names registered under such rules as the Boards of Health of those cities shall establish. All plumbing and drainage in the two cities mentioned must hereafter be done according to the regulations which the Health Authorities will establish.

The pollution of the Passaic River, from which Newark, Jersey City, Patterson, and other places, get their water supply, has recently been the source of a good deal of litigation. The proprietors of a paper mill have been under trial for permitting carbolic acid to flow from their mill into the river. In the course of the trial, it came out that almost all the factories along the river make use of it for getting rid of their refuse matter. The lower Court has brought in a verdict of guilty against the owners of the paper mill. The penalty for such an offence is 500 dols. fine, or two years' imprisonment, or both. The case is to be carried to the higher Courts. On the strength of the facts brought out during this trial concerning the use of the river by all the factories, and by the city of Patterson for general sewerage, some of the cities below the town have threatened to take measures to prevent such pollution. On the other hand, it is claimed that the water four miles below Patterson has been proved by many analyses to be as pure as that taken from the river above the city—that, in fact, the river purifies itself in this distance.

HALESWORTH GAS COMPANY.—The annual general meeting of this Company was held last Friday—Mr. R. B. Baas presiding. The report of the Directors was read and adopted. It recommended payment of a dividend to the Shareholders at the rate of 10 per cent., and a reduction in the price of gas from 5s. 5d. to 5s. per 1000 cubic feet. The retiring Directors—Messrs. C. Smith, R. B. Baas, F. Cross, and C. S. Pedgrift—were re-elected.

THE DISPOSAL OF THE SEWAGE OF BIRMINGHAM.—In April last an application was, it will be remembered, made by the Birmingham, Tame, and Rea District Drainage Board to the Local Government Board for permission to borrow £188,000 for the purchase of land, &c., for works of sewerage and sewage disposal in the Tame Valley. An inquiry into the matter was subsequently held by Mr. J. Thornhill Harrison, C.E., one of the Board's Inspectors. An intimation has now been received from the Central Authority that the application for the loan has been granted.

INSTITUTION OF CIVIL ENGINEERS.—The originality, labour, and ingenuity displayed by the authors of some of the communications submitted to this association during the past session, have led the Council to make ten awards for papers read at the ordinary meetings; four for papers printed in the proceedings without being discussed; and nine for papers read at the supplemental meeting of students. In this last class are the following three awards:—A Miller Prize, to Matthew Buchan Jamieson, for his paper on "The Internal Corrosion of Cast-Iron Pipes;" a Miller Prize, to Thomas Stewart, for his paper on "The Prevention of Waste of Water;" and a Miller Prize, to William Henry Edinger, for his paper on "Brick and Concrete and Concrete Gasholder Tanks."

* The principal points of this address were published in last week's issue, p. 17.—ED. J. G. L.

THE GAS UNDERTAKING OF THE WEST BROMWICH IMPROVEMENT COMMISSIONERS.—At the meeting of the Commissioners last Thursday, the Gas Committee recommended that of the net profits of the gas undertaking to March 25 last, £3000 be transferred to the relief of the rates, £800 be placed to a sinking fund, and £1080 10s. 10d. be carried forward as a balance to the credit of next year's account. Mr. Lees thought it would not be wise to carry forward so small an amount as that recommended by the Committee, and he proposed that the sum of £2000 be transferred to the relief of the rates, £800 to the sinking fund, and the balance carried forward. Mr. Rollason seconded the amendment; but on its being put, Mr. Lees only voted for it, and the original motion was carried.

THE WATER SUPPLY OF TORQUAY.—On Tuesday, the 5th inst., the annual inspection of the Torquay Water-Works, by the members and officials of the Local Board, took place. The works are situated at Tottiford, on Dartmoor, about 15 miles from Torquay. In connection with this year's inspection, the most important feature is the approaching extension of the water-works by the construction of a second and larger reservoir. The present reservoir contains about 200 million gallons, and supplies Torquay, Newton, St. Mary Church, and Cockington, while the new reservoir will hold some 300 million gallons, and the two reservoirs together will cover an area of about 100 acres. Including land, the estimated cost of the new reservoir will be £20,000; and the additional storeage thus obtained will permit, with the aid of duplicate mains, of every house in Torquay having a direct supply of water. After the inspection the party sat down to dinner in the Board's building near the works. A few complimentary toasts were given after dinner; and subsequently a visit was paid to the site of the new reservoir, when the first sods were cut by Mr. Buchanan (the Chairman of the Local Board) and by Mr. J. Kitson, on behalf of his father, Mr. W. Kitson (the Chairman of the Water Committee).

THE RECENT ACCIDENT AT THE LEICESTER NEW GAS-WORKS.—At the meeting of the Leicester Town Council the week before last—the Mayor (Alderman Bennett) in the chair—the Gas Committee reported, in reference to the accident which happened a short time since to the retort-house, that although the entire roof fell, the occurrence was not accompanied by personal injury to any one, and very little damage was done to the gas-producing plant. The report further stated that "Messrs. Shenton and Baker, the Architects, at once came forward in a manner which your Committee feel does them great credit, and stated that wherever the blame may rest it cannot be with the Corporation, and undertook to re-erect the roof at their own cost. This, however, is to be distinctly understood as in no way prejudicing the Architects, or admitting liability as between themselves and others—except to the extent of their relieving the Corporation. Messrs. Shenton and Baker have consulted a civil engineer of extensive experience, and have received a report from him; as, however, it is probable that litigation may ensue, and as the Corporation are already secured against any loss in the matter, it will be obvious to the Council that there should not, at the present meeting, be any discussion of details; and, that in accepting the offer of Messrs. Shenton and Baker, the Committee should not be deemed to express any opinion as to where the fault really lies." The report was adopted.

KEIGHLEY LOCAL BOARD WATER SUPPLY.—On Tuesday, the 28th ult., Mr. C. N. Dalton held an inquiry, at Keighley, into an application to the Local Government Board, by the Keighley Local Board, for sanction to borrow £41,500 for water-works, sewage disposal, and other purposes. The amount required for water-works purposes was £28,000. It was stated that in 1866 the Board obtained sanction to borrow £17,500 for their water undertaking, but did not exercise the power, as in the following year an Act of Parliament was granted giving them authority to raise £20,000. The total cost of the water-works was £229,000, and the present rental was about £4000 a year. A water-rate had been levied since 1877, which amounted to £2500 per annum. Mr. Fieldhouse, a former member of the Board, complained, on behalf of a number of ratepayers, of the high price charged for gas. He objected to the gas profits being devoted to meeting water-works losses. The Inspector said as he understood the application, the whole of the money required for water-works purposes—a sum of between £28,000 and £29,000—was now owed by the Board, and it would have to be paid, and the question was whether they would have a loan for it or would pay it out of current rates. Did Mr. Fieldhouse prefer having a loan? Mr. Fieldhouse said he desired the means to be adopted that would make matters easiest for the ratepayers. He said he did not object to the water-works at all, but repeated his objection with regard to the appropriation of the gas profits. The Inspector said he would lay the objection in this regard before the Local Government Board, and, there being no other opposition, the inquiry terminated.

STOCKTON AND MIDDLESBROUGH CORPORATIONS' WATER SUPPLY.—Last Thursday week a meeting of the Stockton and Middlesbrough Corporations was held at Stockton for the purpose of considering what steps should be taken with the view of providing an additional water supply for the district. The Chairman of the Water Board (Alderman F. H. Bell) stated that the Board would either have to carry out the scheme of 1876 as proposed by Mr. Mansergh, or be content with the present supply. He proposed to complete without delay the purchase of the land and easements needed to carry out the scheme of 1876, which would involve an expenditure of about £50,000. The Board would then be in a position to complete the Blackthorn and Hury reservoirs when they were required, subject to obtaining, if necessary, an extension of the time permitted by the Act of 1876 for carrying out these works. The construction of the Blackthorn reservoir would cost £71,500, which would involve, at 4 per cent., an annual charge of £2860. This would afford a weekly supply of 18,529,000 gallons, which at 3¼d. per 1000 gallons would produce £11,191 revenue. With prudence and care the increased charge would be small. The Hury reservoir would be the next stage required, and would cost from £118,000 to £125,000. This would supply 38 million gallons per week, which would make the total supply as follows:—Pumping station, 60,000,000 gallons; at Blackthorn, 18,529,000 gallons; Hury, 35,000,000 gallons. He was disposed to think that some part of the water would be needed for compensation, but if this were the case, there would still remain a sufficient surplus to pay the interest charges on the total outlay, and provide 90 million gallons per week in 1892, by which time the district, according to Dr. Pole, would require this large quantity. After considerable discussion the meeting was adjourned.——Last Thursday the Corporations again met, and, after some discussion, the following motion, which was one of several propositions submitted, was carried by 32 votes to 5:—"That this meeting do again adjourn to enable the Water Board to make an investigation as to the possibility of obtaining a temporary water supply from the Darlington Corporation"

THE PURCHASE OF THE NEWCASTLE (STAFFS) GAS-WORKS BY THE CORPORATION.—The Town Council of Newcastle-under-Lyme having applied to the Local Government Board for sanction to the raising on loan of £75,000 to carry out the purchase of the works and plant of the Newcastle Gas Company, as some short time since agreed upon, an inquiry was recently held at Newcastle, by Mr. J. T. Harrison, C.E., one of the Board's Inspectors, into the subject of the application. The Town Clerk (Mr. T. Harding) explained at some length the various items making up the amount proposed to be borrowed, the award of the Arbitrators (Mr. G. W. Stevenson and Mr. R. P. Spice) being £65,000 for the purchase-money. This with the costs of the arbitration and other matters made a total of £75,268. The present indebtedness of the borough was, he said, about £46,000, and the rateable value £40,000. The Manager of the gas-works (Mr. W. Winstanley) having explained the item of £1158, the estimated cost of the additions required at the works, the evidence closed. Mr. Bullock, referring to the application of any surplus that might arise from the gas undertaking, said the prevalent idea of the ratepayers was that such profits should go in relief of the rates. The Inspector replied that in the Act there did not appear to be any provision as to the disposal of profits, and therefore it would be for the Town Council to determine the matter themselves. They would have to consider the ratepayers of the borough, and those of the large district outside the borough, and they must let the latter have their gas at as fair and reasonable a price as they could. He knew that in Manchester the profits from the gas undertaking went towards improvements in the city, and no doubt many might be effected in Newcastle, and be very desirable to the ratepayers generally. The first thing, however, was to let consumers have the gas at as reasonable a price as possible. The inquiry was then brought to a close.

APPLICATIONS FOR LETTERS PATENT.

2775.—WOODWARD, J., Manchester, "Improvements in or applicable to apparatus used in the manufacture of gas." June 25, 1881.
2780.—BARLOW, J., Winchester, Hants, "Improvements in pipe joints." June 25, 1881.
2784.—THOMPSON, W. P., Liverpool, "Improvements in and relating to apparatus for consuming the smoke and gases arising from furnaces or steam generators, also applicable in part for generating gas." A communication. June 25, 1881.
2821.—TORR, C. W., Birmingham, "Improvements in supplying air to gas and other lamps, and in conveying the products of combustion therefrom." June 28, 1881.
2838.—CLAUS, C. F., Mark Lane, London, "An improved process for the purification of coal gas." June 28, 1881.
2849.—HAWKINS, J. G., Wigan, Lancs, "Improvements in the means and process for purifying coal gas." June 29, 1881.
2859.—DOWSON, J. E., Westminster, "Improvements in the manufacture and treatment of gas, and in apparatus used therewith or for other purposes." June 30, 1881.
2865.—CLAUS, C. F., Mark Lane, London, "Improvements in and relating to the purification of coal gas, and the recovery of carbonate of soda as a bye-product therefrom." June 30, 1881.
2869.—CLARK, F. W., Westminster, "Improvements in railway-carriage, street, and other gas lamps or lanterns, the improvements being also applicable to other purposes." July 1, 1881.
2919.—WATSON, W., Leeds, Yorks, "An improved means or method of exploding gases in gas-engines." July 4, 1881.
2931.—PASS, E. DE, Fleet Street, London, "Improvements in gas-engines." A communication." June 5, 1881.
2961.—BEECHEY, C. G., Liverpool, Lancs, "Improvements in gas motor engines." July 6, 1881.
2967.—WASTFIELD, E. S., Bath, Somerset, "Improvements in gas-engines." July 7, 1881.

RETURN to the Metropolitan Board of Works of the testings made at the gas-testing stations during the week ending July 6, 1881.

Company.	District.	Illuminating Power. (In Standard Sperm Candles.)			Sulphur. (Grains in 100 Cubic Feet of Gas.)			Ammonia. (Grains in 100 Cubic Feet of Gas.)			Sulphuretted Hydrogen.	Pressure.
		Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.		
The Gaslight and Coke Company	Notting Hill	18·0	16·7	17·4	9·8	8·4	9·0	0·3	0·0	0·2	None.	In excess.
	Camden Town	17·8	17·3	17·6	12·4	10·0	11·5	0·2	0·0	0·1	"	"
	Dalston	18·9	17·6	18·2	13·2	10·0	12·1	1·3	0·0	0·3	"	"
	Bow	17·6	17·0	17·3	13·1	10·4	11·4	1·0	0·5	0·7	"	"
	Chelsea	17·3	16·8	17·1	10·3	9·2	9·7	0·0	0·0	0·0	"	"
	Kingsland Road	17·9	17·5	17·6	13·5	11·9	12·7	0·2	0·0	0·1	"	"
	Westminster (cannel gas)	22·0	21·1	21·6	9·8	7·5	8·6	0·0	0·0	0·0	"	"
South Metropolitan Gas Company	Peckham	17·1	16·5	16·7	11·6	8 2	9·8	1·0	0·0	0·2	"	"
Commercial Gas Company	Old Ford	18·0	17·0	17·5	11·2	8 8	10 2	0·4	0·7	0·5	"	"
	St. George-in-the-East	17·6	17·1	17 4	7·3	4·9	6·4	0·4	0·1	0·2	"	"

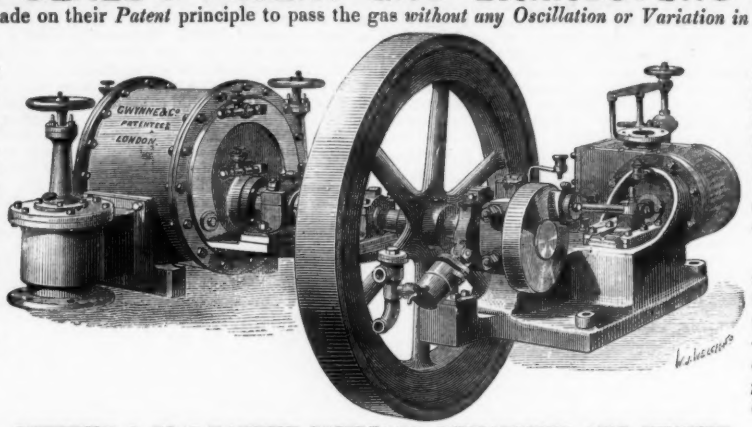
(Signed) T. W. KEATES, F.I.C., Consulting Chemist and Superintending Gas Examiner.

Note.—The standard illuminating power for common gas in the Metropolis is 16 sperm candles, and for cannel gas 20 sperm candles. Sulphur not to exceed 20 grains in the 100 cubic feet of gas at Peckham station, and 17 grains at all other stations. Ammonia not to exceed 4 grains in the 100 cubic feet of gas. Pressure between sunset and midnight to be equal to a column of one inch of water; between midnight and sunset, six-tenths of an inch.

GWYNNE & BEALE'S PATENT GAS-EXHAUSTERS & ENGINES.

Can be made on their *Patent* principle to pass the gas *without any Oscillation or Variation in Pressure.*

THE GRAND MEDAL of MERIT at the VIENNA EXHIBITION, TWO MEDALS at the PHILADELPHIA EXHIBITION, and TWO MEDALS at the PARIS EXHIBITION, have been AWARDED to GWYNNE & Co., for GAS-EXHAUSTERS, ENGINES, and PUMPS; Also 27 OTHER MEDALS AWARDED at all the GREAT INTERNATIONAL EXHIBITIONS.



GWYNNE & CO.

Have made the largest and most perfect GAS-EXHAUSTING MACHINERY in the world, and have completed Exhausters to the extent of 14,000,000 cubic feet passed per hour, of all sizes from 2000 to 210,000 cubic feet per hour.

The Judges' report on the COMBINED EXHAUSTER and STEAM-ENGINE exhibited at the Philadelphia Exhibition is —"*Reliable compact Machine, well adapted for the purpose intended, of excellent workmanship.*"

GWYNNE & CO.'S PATENT COMBINED EXHAUSTER AND ENGINE.

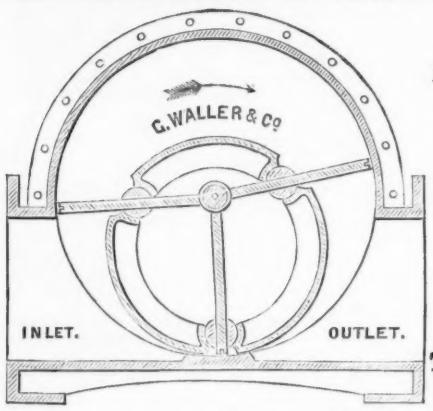
GWYNNE & CO. do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, *but to produce machinery of the very highest quality, and most approved design and workmanship.* The result is that in every instance their work is giving the fullest satisfaction. Numerous testimonials and references can be given to Companies using their Machinery for years past.

Regulators, Bye-Passes, Stop-Valves, Gas-Valves, Station Governors, and Gas Machinery of all Sizes.

PLEASE ADDRESS IN FULL, GWYNNE & CO., Hydraulic and Gas Engineers,
ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C., ENGLAND.

Gwynne & Co.'s New Catalogue on Gas-Exhausting and other Machinery may be obtained on application at the above Address.

G. WALLER & CO.'S NEW PATENT GAS EXHAUSTER.



REDUCED OSCILLATION, FRICTION, AND ENGINE POWER.
WORKED BY BELT OR ENGINE COMBINED.

It has also the following Advantages:—

Reduced cost of Engine, Boiler, and Brickwork.
Economy in yearly cost of Fuel, Oil, &c.
Less Slip, and increased Delivery.
Steady working without heavy Fly-wheel.

ALSO MAKERS OF

BEALE'S AND PUMPING EXHAUSTERS,
INDEX, DISC, AND HYDRAULIC MAIN VALVES,
SELF-ACTING BYE-PASS VALVES,
TAR, LIQUOR, AND WATER PUMPS, DIRECT OR BY GEAR,
SCRUBBERS, PURIFIERS, CONDENSERS, BOILERS, &c.

Descriptive Circular of New Patent Gas Exhauster can be had on application.

PHŒNIX ENGINEERING WORKS:
HOLLAND STREET, SOUTHWARK, S.E.

WANTED, Readers of a Pamphlet, prepared for Gas Companies to distribute to Gas Consumers—"Cooking & Heating by Gas;" on Burners, &c. Copies, by post, Threepence, direct from the Author, MAGNUS OHREN, Assoc.M.I.C.E., Gas-Works, SYDENHAM.

WANTED, by the Advertiser, a Situation as MANAGER of a small Country GAS-WORKS. Thoroughly understands the Manufacture of Gas; Main and Service Laying; Meter Indices and Fixing. First-class testimonials.
Address No. 762, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a Young Man, aged 24, Son of a Gas and Water Works Manager, an ENGAGEMENT as MANAGER of a GAS-WORKS making from 20 to 40 millions, or ASSISTANT in a larger Works. Is well up in Carbonizing, Manufacture of Sulphate of Ammonia, &c. Can use Photometer; fair Draughtsman. Highest references given, or security if required. No objection to go abroad.
Address No. 761, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Situation as Foreman or Working Manager of a small Gas-Works. Above 20 years' experience. Thoroughly understands the Setting of Retorts, Laying Mains and Services, Fitting, and Repairs. Highest references from present employers.
Address F. J. COLINGWOOD, Esq., Engineer, Gas-Works, RHYL.

WANTED, by the Advertiser, aged 19, a Situation in a Gas-Works, as TIME or STORE KEEPER, or any place of trust. Has Collected Accounts, &c., and understands the Taking of Meter Indices. In present situation two years. Satisfactory reasons given for leaving.
Address No. 758, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED immediately, a Stoker used to Working an Exhauster. Wages 24s. 6d. per week. Overtime paid.
Apply, with references, to Mr. H. WIMHURST, Manager, Gas-Works, SLEAFORD.

TO GAS-METER HANDS.

WANTED, for a few weeks, a Steady, Competent, and Experienced Man, to REPAIR GAS-METERS.
Applications, enclosing copies of testimonials, or giving references, and stating age and wages required, to be addressed to No. 763, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

MOLD GAS AND WATER COMPANY.

WANTED, by the above Company, a Steady, Industrious Man as WORKING FOREMAN. He must have a good general Knowledge of the Manufacture and Distribution of Gas; must also be competent to do all the Gas and Water Fitting and Main and Service Laying which may be required. Free house, coal, and gas are provided on the Works.
Applications, enclosing testimonials, and stating salary required, to be sent on or before Monday, the 18th of July, to the SECRETARY, from whom any further information may be had.

OLDBURY GAS-WORKS.

THE Local Board of Health require the Services of a GENERAL MANAGER for their GAS-WORKS, who will undertake the whole of the Superintendence and Management, including the Office as well as the Practical Work connected therewith.
Applications, addressed to the Chairman and Members of the Oldbury Local Board, to be forwarded to Mr. A. Wright, the Clerk to the Board, Big House, Oldbury, stating age, qualifications, and salary required, and accompanied by copies of testimonials (the originals to be produced if asked for) on or before the 26th of July, 1881.

WANTED, Second-hand, two Purifiers, about 6 or 8 ft. square, in good condition,
Address R. KEMP, Bagshot, SURREY.

WANTED, Three or Four Railway TANK TRUCKS for carrying Tar or Ammoniacal Liquor.
Address, stating particulars and price, Box 542, Post Office, MANCHESTER.

FOR SALE—An Annular Condenser, Tower Scrubber, Station-Meter, Beale's Exhauster, two Boilers, some Hydraulic Mains and Retorts, and some Slide-Valves.
Apply at the Gas-Works, MAIDSTONE.

FOR SALE.—A 1-horse power "Otto" Silent Gas-Engine.
Apply to GEORGE WALLER AND CO., Holland Street, Southwark, S.E.

THE Gravesend and Milton Gas Company have FOR SALE, Four 12 ft. square PURIFIERS, 4 ft. deep, with 12-in. Connections and eighteen 12-in. Donkin's VALVES, together with Lifting Apparatus, all in fair condition, and can be taken possession of immediately; also one 10-in. GOVERNOR, by A. Wright and Co., Westminster. One SCRUBBER, 26 ft. high, 8 ft. diameter.
For further particulars apply to the undersigned.
S. SOWOOD, Manager.

GAS PLANT FOR SALE.

THE Sheffield United Gaslight Company have the undermentioned GAS APPARATUS, in good condition, FOR SALE, at their Neepsend Gas-Works:—
Two Jones' Exhausters to pass 80,000 cubic feet per hour.
Three " " 40,000 " "
Three Dry Faced Bye-pass Valves (Newton Chambers' make).
Offers for the above to be sent in addressed to the undersigned.
THOS. ROBERTS, Manager.
Gas Office, Sheffield, May 30, 1881.

TO GAS ENGINEERS AND MANAGERS.

I Have pleasure in intimating my Re-MOVAL to New and more Commodious Premises, situated at 11, Bothwell Street (adjoining *Central* Railway Station) where I hope to receive a continuance of your favours.

D. M. NELSON, Contracting Engineer.
Depôt for Gas and Water Works
Apparatus and Fittings,
11, Bothwell Street, Glasgow, June 4, 1881.

EXHAUSTER FOR SALE.

THE Perth Gas Commissioners have for Sale a WHIMSTER'S PATENT GAS EXHAUSTING AND WASHING MACHINE—15,000 cubic feet per hour—taken out to make room for a larger one. It is in perfect order, and will be sold cheap.

For particulars, apply to WM. MACLIESH, City Clerk, PERTH.

THE Gloucester Gas Company have the undermentioned APPARATUS for Sale:—

About 150 feet of D-shape Wrought-Iron Hydraulic Main, size 19 in. by 19 in. Also about 38 ft. of D-shaped Wrought-Iron Hydraulic Main, size 20 in. by 20 in. Annular Condenser, consisting of six Vertical Pipes, 24 in. diameter, 19 ft. high, with three 12-in. Slide-Valves and 12-in. Connections.

Exhauster (Jones) to pass about 15,000 feet per hour.

One Vertical Steam-Engine, about 6-horse power, with Pulleys, and Shafting used for driving the above.

Boiler 14 ft. 6 in. by 3 ft. 6 in., with Centre Tube, and four Galloway Patent Tubes.

Two 12-in. four-way faced Valves, by Cockey.

For further information, &c., apply to the undersigned,
R. MORLAND, Engineer.

TO TAR DISTILLERS AND OTHERS.

THE Directors of the Kingston-upon-Thames Gas Company are prepared to receive TENDERS for the Purchase of the Surplus TAR produced at their Works from Aug. 1, 1881, to June 30, 1882. The probable quantity will be about 160,000 gallons.

Further particulars may be obtained of Mr. H. F. Packham, Engineer, Gas-Works, Lower Ham Road.

Tenders will be required to be sent in, addressed to the Chairman, not later than Tuesday, July 19, 1881.

The Directors do not bind themselves to accept the highest or any tender.

By order,
W. A. FRICKER, Secretary.

TO TAR DISTILLERS AND OTHERS.

THE Directors of the Radcliffe and Pilk-ington Gas Company are prepared to receive TENDERS for the Purchase of the Surplus TAR produced at their Works in Radcliffe during the year commencing Aug. 12, 1881.

Additional information may be obtained from the undersigned, to whom also tenders (stating the price per ton) must be sent on or before Tuesday, the 26th inst.

The Directors do not bind themselves to accept the highest or any tender.

JAMES BRADDOCK, Manager and Secretary.
Gas-Works, Radcliffe, near Manchester,
July 9, 1881.

COLNE AND MARSDEN LOCAL BOARD.

COAL CONTRACT.

THE Gas Committee of the above Board invite TENDERS for the Supply of Good Screened GAS COAL for their Works, delivered at Colne Railway Station in such quantities as their Manager directs for One, Two, or Three years from Oct. 1, 1881. Probable quantity about 3000 tons per year. The Coal to be of good quality, and free from all refuse.

Tenders to be endorsed "Tender for Gas Coal," addressed to the undersigned on or before July 22 inst.

The Committee do not bind themselves to accept the lowest or any tender.

THOMAS VARLEY,
Gas-Works, Colne, Lancashire, July 8, 1881.

SULPHATE OF AMMONIA PLANT.

THE Corporation of the Borough of Dewsbury invite TENDERS for an APPARATUS to Manufacture Two Tons of SULPHATE of AMMONIA per diem, at their New Gas-Works, Savile Town.

Further information may be had on application to the undersigned.

Sealed tenders to be sent to Jesse Smith, Esq., Town Clerk, Dewsbury, not later than Wednesday, the 27th of July next.

C. ARMITAGE, Engineer and Manager.

TAR CONTRACT.

THE Directors of the Gloucester Gas Company are prepared to receive TENDERS for the Surplus TAR produced at their Works for a term of One, Two, or Three years from Oct. 1, 1881.

The Tar will be delivered into boats or barges at their wharf on the Gloucester and Berkeley Canal.

Payments must be made monthly, and offers to be at per ton of 20 cwt.

Tenders to be sent in to me, marked "Tar Contract," on or before Aug. 1, 1881.

The Directors do not bind themselves to accept the highest or any tender.

R. MORLAND, Engineer and Manager.

TO COLLIERY PROPRIETORS, COAL MERCHANTS, AND OTHERS.

THE Directors of the Alton Gas and Coke Company invite TENDERS for the Supply of 850 Tons of Good GAS COALS, to be delivered, carriage paid, on rails at Alton Station (L. & S. W. Ry.) in quantities as under:—

100 tons	during the month of	August,	1881.
200	,, ,,	September,	,,
250	,, ,,	December,	,,
200	,, ,,	February,	1882.
100	,, ,,	March,	,,

The Coal to be of good quality, free from bats, bind, pyrites, and other refuse.

Tenders to state from what Colliery the Coals are obtained.

Terms of payment, cash at a month.

The Directors do not bind themselves to accept the lowest or any tender.

Tenders to be sent in not later than Saturday, July 23, 1881.

H. W. ELLIOTT, Secretary.

BOROUGH OF BRADFORD.

TO COLLIERY PROPRIETORS.

THE Gas Supply Committee of the Bradford Corporation are prepared to receive TENDERS for the Supply of Best GAS COAL and CANNEL, both to be well screened, dressed, and free from shale and pyrites; to be delivered at the several Works of the Corporation, in the Borough, during the period of One year, or of Two or Three years, commencing on the 8th of August next, in such quantities, weekly, as may be agreed upon.

Form of tender, with any further information required, may be had on application to Mr. Swallow, at the Gas Offices, Town Hall.

Sealed tenders, endorsed "Tender for Coal," to be delivered to me on or before the 28th of July inst.

The Committee do not bind themselves to accept the lowest or any tender.

By order,
W. T. M'GOWEN, Town Clerk.
Town Hall, Bradford, July 4, 1881.

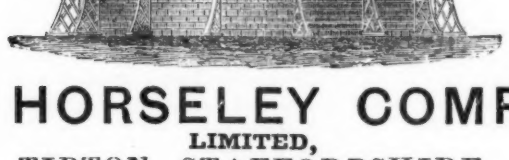
CORPORATION OF SOUTHPORT—GAS DEPARTMENT.

THE Gas Committee invite Tenders for a Supply of CANNEL and COAL required at the Gas-Works.

For conditions of contract and form of tender—which form only must be used—application to be made to Mr. J. Booth, Gas Manager.

Tenders must be forwarded to me not later than Thursday, July 21, 1881, endorsed "Tender for Coal."

J. H. ELLIS, Town Clerk.
Southport, July 1, 1881.



THE HORSELEY COMPANY,

LIMITED,

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

6, WESTMINSTER CHAMBERS, VICTORIA STREET,

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,

AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

NORTH BRITISH ASSOCIATION of GAS MANAGERS.

THE

TWENTIETH ANNUAL GENERAL MEETING

of the Members of this Association will be held in the HALL of the INSTITUTE of ENGINEERS, 207, BATH STREET, GLASGOW,

On THURSDAY & FRIDAY, July 21 & 22, 1881.

JAMES M'GILCHRIST, Esq., PRESIDENT,

Will occupy the Chair.

PROCEEDINGS.

THURSDAY, JULY 21.

Chair to be taken at Ten o'clock A.M.

BUSINESS MEETING.

Reading of Minutes.—Admission of New Members, &c.

PRESIDENT'S INAUGURAL ADDRESS.

Auditor's Report.—Election of Office-Bearers.

READING OF PAPERS.

DINNER.

At Half-past Four o'clock, the Members will Dine in the Grand Hotel, Charing Cross. The Presentation to Mr. William Mackenzie will thereafter be made. Tickets for the Dinner, 4s 6d each, may be had from the Secretary; early application for which is specially requested.

FRIDAY, JULY 22.

Chair to be taken at Nine o'clock A.M.

Reading of Papers, &c., not completed, will be resumed.

LIST OF PAPERS AND COMMUNICATIONS.

1. "Heating by Gas." By Mr. JAMES HISLOP, of Partick, Hillhead, and Maryhill.
2. "Gas Service-Pipes." By Mr. WILLIAM MACKENZIE, of Dunfermline.
3. "Two New Processes of Gas Purification, based on the direct Utilization of its Impurities in the Production of Commercial Salts." By Mr. GEORGE VALENTINE, F.C.S., of Arbroath.
4. "Regenerative Gas-Firing for Retorts." By Mr. ALF. WILSON, of Middlesbrough.
5. "Remarks on Preventing Freezing of Gasholder Lutes." By Mr. D. B. ESPLIN, of Forfar.
6. "A Year's Experience of Young's Patent Washer-Scrubber." By Mr. ANDREW SCOTT, of Falkirk.
7. "Modified System of Carbonizing." By Mr. A. MALAM, of Dumfries.

EXCURSION.

Arrangements are being made for the Members and Lady Friends having an Excursion to, and Sail on Loch Lomond, on Friday, July 22, by Train leaving Queen Street Station at 11.15 a.m. Further particulars by Circular.

DAVID TERRACE, Secretary.
Dawsholm Gas-Works, Maryhill,
Glasgow, July 6, 1881.

Now Ready, in Pamphlet Form; Price 6d., post free.

OBSERVATIONS on Glass as an Obstructor and Reflector of Artificial Light. By F. W. HARTLEY, A. Inst. C.E., Hon. Memb. British Association of Gas Managers. Being a Series of Three Articles reprinted from the JOURNAL of Jan. 11, 18, 25, 1881.

London: WALTER KING, 11, Bolt Court, FLEET ST., E.C.

PRINTED FOR DISTRIBUTION BY GAS COMPANIES AND CORPORATIONS.

THE Value of Paraffin Oil as an Illu-MINANT, COMPARED WITH COAL GAS.

Being an article contributed to the JOURNAL of May 3, by F. W. Hartley, A.I.C.E., Hon. Memb. British Association of Gas Managers. Arranged as a 4 pp. fcap. leaflet. Price 10s. per 100.

London: WALTER KING, 11, Bolt Court, FLEET ST., E.C.

TO GAS COMPANIES AND MUNICIPAL AUTHORITIES SUPPLYING GAS.

CONSPIRACY AND PROTECTION OF PROPERTY ACT, 1875.

It is required, under a Penalty of FIVE POUNDS, that a Printed Copy of the 4th Section of the above Act shall be posted up at all Gas-Works, in a conspicuous place, where the same may be conveniently read by the persons employed thereat.

Printed copies of the Section, in large type, on broad sheets, may be had of WALTER KING, 11, Bolt Court, Fleet Street, E.C. Price 2s. per dozen, or 10s. 6d. per 100, post free.

The Act extends to Scotland and Ireland.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

THE GENERAL GAS HEATING AND LIGHTING APPARATUS COMPANY, LIMITED.

Incorporated under the Companies' Acts, 1862 to 1880, whereby the Liability of the Shareholders is limited to the Amount of their Shares

CAPITAL, £50,000, IN 5000 SHARES OF £10 EACH.

Deposit £1 per Share on Application and £2 per Share on Allotment, and the remainder as may be required, but One Month's Notice at least will be given of any Calls.

3000 *ORDINARY SHARES ARE NOW OFFERED FOR ALLOTMENT.*

IF NO ALLOTMENT IS MADE, DEPOSITS WILL BE RETURNED IN FULL.

Interest at the rate of £5 per cent. per annum will be allowed upon all payments in advance.

DIRECTORS.

JAMES GLAISHER, Esq., F.R.S., Blackheath, Kent, *Chairman.*
ALFRED CARPENTER, Esq., M.D., J.P., Duppas House, Croydon.
ALFRED KITT, Esq., C.E., 1, Lupus Street, Pimlico, S.W.
WILLIAM C. PARKINSON, Esq., Cottage Lane, City Road, E.C.
CORBET WOODALL, Esq., C.E., Palace Chambers, Bridge Street, Westminster, S.W.
S. LEONI, Esq., *ex officio*, Adamas Works, St. Paul Street, Islington, N.

SOLICITORS—Messrs. YOUNG, JONES, ROBERTS, & HALE, St. Mildred's Court, E.C.

BANKERS—LONDON AND COUNTY BANK, Lombard Street, E.C.

SECRETARY (*pro tem.*)—WILLIAM ROBERTSON, Esq.

Registered Offices of the Company—No. 40, FINSBURY CIRCUS, LONDON, E.C.

PROSPECTUS.

The Metropolis contains upwards of half-a-million houses; of this number more than one-half are not, and never have been, supplied with Gas, while only in a very small proportion of the remainder is Gas used for the purposes of Heating and Cooking, though its great advantages for these uses are now generally admitted. A principal reason for this is to be found in the fact that the first cost of gas-fittings, and especially of stoves, forms a burden which many householders hesitate to incur.

The considerable reduction recently notified in the price of Gas in London, and in many provincial towns, together with the attention which has been called to the nuisance of smoke consequent upon the wasteful use of coals for cooking and warming, which the use of gas would materially diminish, has suggested that the present is an opportune period to found a Company for the purpose of supplying and fitting every kind of apparatus of the best description for the use of Gas for Heating, Cooking, Motive Power, or ordinary Lighting, so as to bring them within reach of all classes.

The published reports and recent operations of many Gas Companies show them to be alive to the advantages derivable from an extension of their business in these directions. With the purpose of enlightening the public on this matter, Exhibitions of Gas Apparatus, promoted by various Gas Companies and Corporations, have been lately held in many large towns, including Birmingham, Leicester, Coventry, Leeds, Bradford, Newcastle-on-Tyne, South Shields, Halifax, Ipswich, Glasgow, Belfast, and Dublin, and the interest of the public in these Exhibitions was proved by the large number of persons who visited them.

Many Gas Companies have already adopted a system of providing their consumers with Kitcheners on hire for Cooking by Gas at a small quarterly rent. It is believed that this system, so beneficial alike to the Companies who produce and the public who consume, will have a large extension, and that this Company may fairly expect its full share of business from this source.

Gas has hitherto suffered in public estimation, and its use been largely retarded, by the failure to devise really efficient apparatus in which to employ it, but of late years great improvements have been made in this direction; and this Company will not limit itself to the invention and manufacture of apparatus, but will seek to introduce the best productions of other makers.

The Company propose to establish Depôts in town and country where apparatus can be seen in operation, and where arrangements can be made for the proper erection and fitting of the same by competent workmen.

This Company has acquired as a nucleus the well-known and established business of Messrs. S. Leoni and Co., Engineers and Manufacturers of Gas Apparatus for Heating, Lighting, and Cooking, St. Paul Street, New North Road, and 74, Strand, London, and has retained the services of Mr. Leoni as Manager.

The Company will acquire the various leases, plant, machinery, tools, fixtures, fittings, dies, and patterns, at the agreed price of £9200. The Company will also acquire the stock-in-trade, both manufactured and unmanufactured, at the cost price of £13,240, of which £8000 will be paid in shares, the dividend upon which is contingent upon all the paid-up ordinary capital receiving interest at the rate of at least 6 per cent., the balance of £5240 in equal proportions yearly for five years in cash, or in similar deferred shares as the Directors may elect; the first instalment to be paid 31st of December, 1881.

Mr. Leoni binds himself to retain an interest in the Company to the amount of £5000 in fully paid-up shares for a period of seven years.

No promotion-money will be paid, and it is intended to place the shares privately, without the expense of advertising.

The only contracts with the Company are two, respectively made between S. Leoni of the one part and the Company of the other part, dated respectively the 16th day of June, 1881, and which may be inspected at the Offices of the Company. It will be seen from these contracts that the Company take over the benefit and undertake the performance of existing orders and contracts in connection with the business, since the 31st of December, 1880. It is believed that these last-mentioned contracts are not such as require to be specified under the provisions of the 38th section of the Companies' Act, 1867, but attention is called to them here in order to obviate any question on the subject.

Prospectuses and Forms of Application may be obtained from the Bankers and at the Offices of the Company, and the Memorandum and Articles of Association may be seen at the Offices of the Company.

WILLIAM SUGG & COMPANY,

LIMITED,

VINCENT WORKS, Vincent St., Westminster; GRAND HOTEL BUILDINGS, Charing Cross, S.W.; and RUE DES PYRAMIDES, Avenue de l'Opera, Paris.

Engineers & Manufacturers of Apparatus for Lighting, Heating, & Cooking by Gas.

CAPITAL, £150,000, IN 15,000 SHARES OF £10 EACH.

FIRST ISSUE OF 10,000 SHARES.

These 10,000 Shares are now offered to the Public at par, payable as follows:—

10s. on Application, 10s. on Allotment, £1 in One Month after Allotment, the remainder in Calls, not to exceed £2 each Call, with intervals of Three Months between each Call.

It is not anticipated that more than £6 per Share will be required.

DIRECTORS.

CAPTAIN GIFFARD, Chairman, Director of The Gaslight and Coke Company, 53, St. George's Square, S.W.

HY. LAWRENCE HAMMACK, Esq., C.C., Director of the Commercial Gas Company, 59, Bishopsgate Street, E.C.

N. E. B. GAREY, Esq., Director of the Continental Union Gas Company and the Cie. L'Union des Gaz, 60, Anerley Park, S.E.

S. E. ILLINGWORTH, Esq., J.P., 9, Norfolk Crescent, W., and Borough Court, Winchfield.

R. H. JONES, Esq., J.P., F.S.S., Vice-President of The Gas Institute, The Briars, Sydenham, S.E.

MANAGING DIRECTOR AND ENGINEER—WILLIAM SUGG, Esq., A. INST. C.E.

BANKERS—THE CENTRAL BANK OF LONDON, 52, Cornhill, E.C.

AUDITORS—To be elected by the Shareholders at the General Meeting.

SOLICITORS—Messrs. ARGLES & ARGLES, 85, Gracechurch Street, and at No. 10, Rue Louis le Grand, Avenue de l'Opéra, Paris.

Temporary Offices—85, GRACECHURCH STREET, E.C., and 1, GRAND HOTEL BUILDINGS, CHARING CROSS, S.W.

THE object of this Company is to take over, and by largely extending the important works of Mr. Sugg, to furnish the public with the best means and appliances for burning Gas, not only for Lighting, but for Heating and Cooking purposes, for which the demand is much on the increase.

The Directors are largely interested in the prosperity of Gas Undertakings, and possess a knowledge of the wants of the present time in that respect.

A contract has been entered into, on behalf of the Company, for the purchase of Mr. Sugg's business, both in England and France, as a going concern, together with the Patents of his several Inventions, the Leases of the Premises, the Plant and Machinery, and the Stock-in Trade, for the sum of £40,000, and half the net profits after £7 per cent. has been paid to the Shareholders.

The net profits will, therefore, be divided as follows:—

First. Set aside £1000 per annum as a reserve fund.

Second. Seven per cent. per annum amongst the Shareholders.

Third. Any surplus of the net profits over 7 per cent. to be equally divided for 21 years between Mr. Sugg and the Shareholders; after 21 years the whole to go to the Shareholders.

No promotion-money will be paid.

Prospectuses and Forms of Application for Shares may be obtained on personal application, or by letter addressed to Mr. Sugg, the Managing Director, at 1, Grand Hotel Buildings, Charing Cross, or from the Bankers or Solicitors.

In the event of no allotment being made, all amounts paid on application for Shares will be returned in full.

The Share List will be closed at an early date, of which notice will be given.

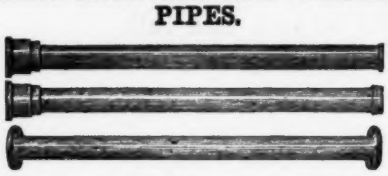
CRANSTON'S DEEP BORING MACHINERY.

Artesian Wells Bored Straight and Round up to 18 in. diameter, and Prospecting for Minerals to any depth.
For terms and particulars of rapid and economical work accomplished, apply to J. G. CRANSTON, 22, Grey Street, NEWCASTLE-ON-TYNE.

THE Employers' Liability Assurance CORPORATION, Limited, Subscribed Capital, £500,000, is now prepared to assure against
EMPLOYERS' LIABILITY ACCIDENTS.
WORKMEN'S ACCIDENTS.
RAILWAY and MINING ACCIDENTS.
GENERAL ACCIDENTS.
SPECIAL ACCIDENT RISKS of all KINDS.
No Specification of Individuals required.
Protection granted pending issue of Policy.
Application for Agencies invited.
For Prospectus, Proposal Forms, &c., apply to S. STANLEY BROWN, General Manager.
Offices, 84 and 85, King William Street, E.C.

WILLIAM MACLEOD & CO.,
30, ST. ENOCH SQUARE, GLASGOW.

CAST-IRON GAS AND WATER PIPES.



Sole Agents in Scotland for the Torbay Paint Co

Prices on application.

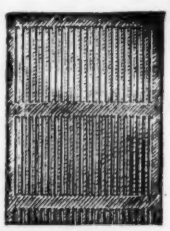
WATER SUPPLIES
FOR
TOWNS AND FACTORIES.

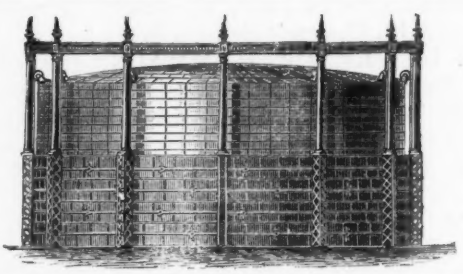
PATENT "ABYSSINIAN" TUBE WELLS.

LE GRAND & SUTCLIFF,
ARTESIAN WELL ENGINEERS,
100, BUNHILL ROW, LONDON.

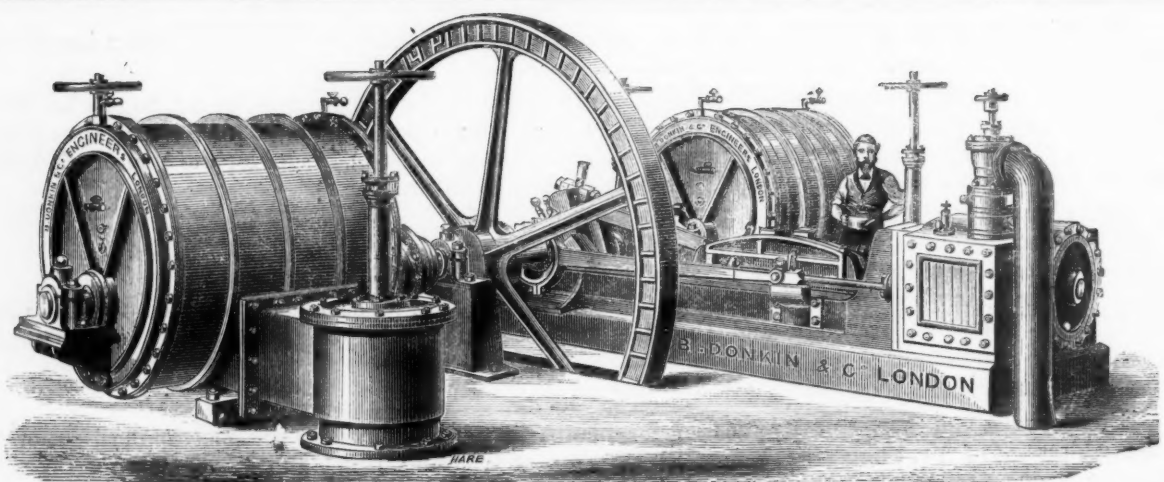
Now ready, Fscp. fo., in Coloured Wrapper, price 2s. 6d., post free.
THE TRANSPORT OF MATERIALS FOR GAS-WORKS.
Illustrated by the Plans of the York, Newcastle-on-Tyne, and Beckton Gas-Works.
A Series of Articles Communicated to the JOURNAL OF GAS LIGHTING, &c.
By V. WYATT,
Constructing Engineer to The Gaslight and Coke Company.
Accompanied by three lithographed Plans of the Works referred to, and the Board of Trade Specimen Plan of Gas-Works.
London: WALTER KING, 11, Bolt Court, FLEET ST., E.C.

THE
THAMES BANK IRON COMPANY,
UPPER GROUND STREET, LONDON, S.E.,
SUPPLY FROM STOCK
CAST-IRON RETORTS AND ALL KINDS OF GAS-WORKS APPARATUS,
SOCKET-PIPES FOR GAS OR WATER PURPOSES,
FLANGE-PIPES FOR STEAM,
RAIN-WATER PIPES AND GUTTERS,
HOT-WATER BOILERS, PIPES, AND CONNECTIONS,
LAMP-COLUMNS, LAMPS, LAMP-FRAMES, WROUGHT TUBES, &c.,
HOT WATER AND HOT AIR APPARATUS.
Erected complete on the most Improved Principles.

R. DEMPSTER AND SONS'

WOOD SIEVES FOR PURIFIERS,
WITH TAPER OR PARALLEL BARS,
MADE BY SPECIAL MACHINERY.
SCRUBBERS FILLED WITH BOARDS,
On our approved principle, for the extraction of Ammonia.
Prices on application. References to First-Class Engineers.
ROSE MOUNT IRON-WORKS,
ELLAND, NEAR HALIFAX.
LONDON OFFICE: 106, CANNON STREET, E.C.



HENRY BALFOUR & CO.,
ENGINEERS, IRONFOUNDERS, AND GAS APPARATUS MAKERS,
39, FINSBURY CIRCUS, LONDON, E.C.
Works: DURIE FOUNDRY, LEVEN, FIFE, N.B.
MANUFACTURERS OF
GASHOLDERS, SINGLE OR TELESCOPE, WITH OR WITHOUT COUNTERBALANCE GEAR; TANKS, CAST & WROUGHT IRON.
BOILERS, CONDENSERS, CRANES, EXHAUSTERS AND ENGINES,
GIRDERS (Cast and Wrought Iron), IRON PIPES, PUMPS, PURIFIERS, RETORTS & FITTINGS,
ROOFS, SCRUBBERS, SHAFTING, VALVES, WASHERS.
ANDERSON'S PATENTED INVENTIONS, VIZ.—
FOUR-WAY BYE-PASS VALVES, ENGINES AND EXHAUSTERS, REVOLVING BRUSH SCRUBBERS, GAS-WASHERS, FUEL-MAKING MACHINES, GOVERNORS, &c.
H. B. & Co. undertake Contracts for the Supply and Erection of Gas-Works, either for Towns or Mansions, or the Remodelling of existing Works.
SHIPPING ORDERS receive special attention.
H. B. & Co. having had large experience in this Department, undertake to ship, f.o.b., properly packed and marked for export.
ESTIMATES AND DESIGNS ON APPLICATION.



View of the Largest Exhausters ever made (250,000 cubic feet per hour). Sole Makers of Beale's New Patent.

BRYAN DONKIN & CO.,
BERMONDSEY. Estd. 1803.

B. D. & Co. have lately erected Eight of these Exhausters (to pass 2 million cubic feet per hour) in one house, each pair having their slides at right angles, to ensure a steady gauge.

Makers also of GAS, WATER, AMMONIACAL LIQUOR, HYDRAULIC MAIN, BYE-PASS VALVES, &c., &c.